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ABSTRACT

This document contains teaching modules based on 17 objectives for grade 3 mathematics. The modules may be used for program evaluation and curricular planning as well as detailed outlines for classroom activities. Each module has eight sections: (1) "Objective"; (2) "Explanation of Objective"; (3) "Prerequisite Skills"; (4) "Vocabulary"; (5) "Lesson Plan Outline" (providing suggestions for introducing the objective, daily activities, and a culminating activity); (6) "Materials" (listing needed manipulatives and exhibits); (7) "Sample Test I"; and (8) "Sample Test II." The appendices include: "Mississippi Basic Skills Mathematics--Grade 3"; "Grade Three--Answer Key to Sample Tests"; and "Diagnostic/Prescriptive Evaluation Sheets" (third grade Basic Skills Assessment Program mathematics objectives). (YP)

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MATHEMATICS TEACHING MODULES
BASIC SKILLS ASSESSMENT PROGRAM
GRADE THREE

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Preface

The materials contained in this document were developed in response to recommendations of The Mississippi Mathematics Improvement Task Force. The task force, appointed by Richard A. Boyd, recommended major steps that the State Board of Education should take to improve the level of mathematics competence of public school students.

The State Department of Education entered into a contract with Delta State University to assess the specific problems students in grades 3 and 5 were encountering on the Basic Skills Assessment Program subtest of mathematical skills. The results of this needs assessment led to the development of the Mathematics Teaching Modules.

Dr. Becky Lynchard developed the text for these modules. Dr. Rose Strahan served as project consultant. Dr. Reid Jones administered the project and the field test of the teaching materials. Dr. Gene Hamon was responsible for computer-based publishing. Dr. Larry Hailey was responsible for long range curriculum planning.

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Teacher's Guide

Uses for the Teacher

The Teaching Modules may be used for program evaluation and curricular planning as well as detailed outlines for classroom activities. They have been designed for diagnostic/prescriptive use in teaching and reteaching, remediation efforts, extended school sessions, or for individual tutoring.

Parts of the Modules

Each teaching module contains eight sections:

1. **Objective**--brief statement of the Basic Skills objective
2. **Explanation of Objective**--brief comments on how the objective will be measured on the BSAP
3. **Prerequisite Skills**--skills that are essential for understanding the objective, listed in descending order from most difficult to least difficult
4. **Vocabulary**--the words and definitions which are needed to understand the objective
5. **Lesson Plan Outline**--suggestions for introducing the objective, detailed activities for several days of instruction, and a culminating activity
6. **Materials**--lists of needed manipulatives and exhibits
7. **Sample Test I**
8. **Sample Test II**

Cautions

The modules should not be used as the entire mathematics teaching effort for grades three and five. Since the modules are keyed to the BSAP skills, they represent only a subset of the basic skills outlined in the *State Curriculum Structure*, and very little emphasis is placed on higher order thinking skills.

The TIPS are refined annually; however, this does not change test content or objective numbers. Further, all students at grades 3 and 5 will be using an answer format on the BSAP which requires them to darken in 1 of 4 circles on the test booklet rather than choose from the traditional multiple choice format of alternatives "A through D".

Appended Materials

The appendices contain the following:

Appendix A--List of BSAP Mathematics Skills

Appendix B--Answer Sheets for Sample Tests

Appendix C--State Averages on BSAP Mathematics

Appendix A
Mississippi Basic Skills
Mathematics--Grade 3

- 3.1 Identify numerals to 9,999
- 3.2 Identify number words through thousands
- 3.3 Use $<$, $>$, or $=$ to compare two numbers
- 3.4 Use the symbols $+$, $-$, $\div$, $\overline{\hspace{1cm}}$, or $\times$
- 3.5 Identify fractional parts from halves through fifths
- 3.6 Add through 3-digit whole numbers, regrouping as necessary
- 3.7 Subtract through 3-digit whole numbers, regrouping as necessary
- 3.8 Multiply using basic facts through 5×9
- 3.9 Divide using basic facts through $45 \div 9$
- 3.10 Identify circles, triangles, rectangles, or squares
- 3.11 Tell time to the hour, half hour, or quarter hour
- 3.12 Measure length to nearest centimeter or inch
- 3.13 Select the appropriate unit of measure (English or metric) for problems involving length
- 3.14 Make change up to one dollar
- 3.15 Compare relationships among coins up to one dollar: pennies, nickels, dimes, quarters
- 3.16 Compare relationships among calendar units: days, weeks, months, years
- 3.17 Solve word problems involving whole numbers, using one of the basic operations

GRADE THREE - ANSWER KEY TO SAMPLE TESTS

Objective #	Sample Test 1 (Pre-test) ¹										Sample Test 2 (Post-test) ¹									
	Item #										Item #									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3.1	A	C	C	B	C	A	B	D	D	B	A	C	C	D	B	A	D	B	C	A
3.2	A	D	C	B	B	A	C	D	D	A	B	D	A	D	C	C	A	C	D	B
3.3	A	C	C	A	A	C	C	C	A	A	C	A	A	B	A	C	A	A	B	C
3.4	A	D	B	A	C	B	B	D	C	B	B	C	B	D	D	A	C	A	D	B
3.5	B	A	D	C	D	A	C	B	D	C	B	D	A	A	D	C	A	B	C	D
3.6	B	D	A	C	D	A	B	C	D	B	C	A	D	D	B	A	B	C	D	B
3.7	A	A	D	D	C	B	A	C	A	B	A	D	B	D	C	A	B	C	B	C
3.8	B	A	D	B	C	C	B	A	D	D	A	C	D	A	B	C	B	D	A	A
3.9	A	B	A	D	C	D	B	A	B	C	A	D	C	B	A	B	C	A	D	B
3.10	A	C	D	B	B	[A	B	D	A	B]	B	A	C	D	C	[B	A	D	B	A]
3.11	A	D	B	C	A	[C	B	A	B	D]	A	B	C	C	D	[C	D	A	C	B]
3.12	C	B	C	B	A	[C	B	A	C	B]	D	C	C	B	B	[C	B	A	C	D]
3.13	B	A	D	A	C	C	A	B	D	B	C	A	D	A	B	C	D	B	C	A
3.14	A	D	C	C	B	B	A	B	D	C	B	A	B	D	C	A	D	C	C	D
3.15	A	D	C	A	B	[B	A	D	C	A]	B	A	D	A	C	[B	C	A	D	A]
3.16	C	A	B	A	D	C	B	C	A	D	D	A	A	B	C	B	A	D	B	A
3.17	B	A	D	D	C	A	B	C	A	D	A	C	B	B	D	C	A	C	A	B

¹ Please note that when an objective is composed of Part 1 (items 1 through 5) and Part 2 (items 6 through 10), that we have listed the answers in sequence. This occurs on Objectives 3.10, 3.11, 3.12, and 3.15. We have put brackets around the items that occur as Part Two in these tests. Thus, on these tests, Part 2 is numbered 1 through 5, just as Part 1. However, the Answer Key Table lists the answers as 6 through 10, for convenience.

DIAGNOSTIC/PRESCRIPTIVE EVALUATION SHEETS

Third Grade BSAP Mathematics Objectives

OBJ#	Description (For exact wording, see Modules)	State Averages ¹			Student, class, school, or district		Priority Rank
		1987	1988 ²	1989 ²	1	2	
3.1	Identify place value of digit (3 or 4 digit numerals).	90.9	95.5	96.2			
3.2	Identify number words through thousands.	86.0	89.2	91.2			
3.3	Use symbols (<, >, or =) to compare two numbers.	84.8	88.4	88.7			
3.4	Use symbols (+, -, x, ÷, or /) .	97.6	98.1	98.6			
3.5	Identify fractional parts (halves through fifths).	75.9	92.4	95.2			
3.6	Add three digit whole numbers, regrouping as needed.	91.7	93.1	92.2			
3.7	Subtract three digit whole numbers, regrouping.	90.4	86.8	89.1			
3.8	Multiply, using basic facts through 5 x 9.	96.4	95.0	93.8			
3.9	Divide, using basic facts through 45 ÷ 9.	87.0	87.3	83.6			
3.10	Identify circles, triangles, rectangles, or squares.	95.9	95.8	94.4			
3.11	Tell time to the hour, half-hour, or quarter-hour.	93.3	91.8	94.7			
3.12	Measure length to nearest centimeter or inch.	99.2	98.9	98.8			
3.13	Select English or Metric unit of length.	70.5	71.7	78.1			
3.14	Make change up to one dollar.	77.2	79.6	82.5			
3.15	Compare relationships among coins up to one dollar.	94.5	92.8	93.2			
3.16	Compare relationships among calendar units.	79.8	86.9	87.8			
3.17	Solve word problems involving whole numbers.	84.3	82.7	83.6			
TOTALS³		87.7	90.0	90.7			

APPENDIX C

Notes:

¹Data sources include State Department for 1987; Pupil Performance (from SDE) for 1988 and 1989.

²Minor test modifications on the BSAP were made in 1988, also affecting 1989 scores.

³Based on the averages reported above.

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.1

Identify numerals to 9,999.

Explanation of Objective

Identify place value in numerals greater than 100 but less than 10,000 by matching an underlined digit with its place value.

Prerequisite Skills (descending order)

- (a) Identify the place value of a given digit in a three-digit numeral.
- (b) Identify numerals 100 to 999.
- (c) Identify the place value of a given digit in a two-digit numeral.
- (d) Identify numerals 0 to 99.
- (e) Identify cardinal numbers to indicate how many objects are in a given set (11 to 20).
- (f) Count 0 to 50 objects using correct number names.
- (g) Identify cardinal numbers to indicate how many objects are in a given set (0 to 10).

Vocabulary

digit
place value
ones
tens
hundreds
thousands

Lesson Plan Outline

Introduction:

Use 3 orange juice containers labeled ones, tens, and hundreds. Have ten red, ten blue, and ten green popsicle sticks where the red sticks represent the ones, the blue sticks represent the tens, and the green sticks represent the hundreds. Show the students 1 red popsicle stick and say, "This is 1 popsicle stick." Show 2 red sticks and say, "Here are 2 popsicle sticks." Continue until you have done this for 9 popsicle sticks. Then, put the 9 sticks in the container labeled "ones". Hold the container and say, "Nine red popsicle sticks are all that can go into this ones container. When you put one more red stick you will have 10 sticks. These sticks must then be moved to the tens container because you have 1 ten. One blue stick can be used in place of all the red sticks because 1 blue stick = 10 red sticks (write on board)." Show the 1 blue stick and say, "This is 1 ten." Show

2 blue sticks and say, "Here are 2 tens." Continue until you have done this for 9 blue sticks. Put these 9 sticks in the tens container and say, "Nine blue sticks or 9 tens are all that should go into the tens container. When you add one more and make 10 tens you must move them to the hundreds container because 10 tens = 1 hundred. Ten tens can be shown with 1 green stick because 1 green stick = 10 blue sticks or 1 green stick = 1 hundred. Now, place 2 red sticks in the ones container, 5 blue sticks in the tens container and 3 green sticks in the hundreds container. Ask how many ones, tens, and hundreds. Draw a place-value box on the board to represent the number in the containers. Then, write the numeral 352 on the board. Explain that each numeral or symbol (i.e., 3, 5, and 2) is called a digit. Ten digits are used to show numerals. They include 0 - 9. Have students take turns showing other numbers in the containers, in the place-value box, and on the board.

Activities:

Day 1:

1. Have students work in pairs with one student representing a number with popsicle sticks and the other student writing the corresponding numeral in a place value box and reading the numeral.
2. Have groups of 4 students each play Concentration where a match consists of pairing an underlined digit in a numeral to the digit's place value name.

Example: 534 matches ones

Day 2:

1. Extend the Introduction activity to introduce and explain the thousands place. Use orange popsicle sticks to represent thousands (i.e., one orange stick = 1000).
2. Adapt Activities #1 and #2 Day 1 to include the thousands place.

Example: 2349 matches thousands

Culmination:

Check students' understanding of place value by showing flash cards with numerals from one to 9,999. Ask students to show the numeral in the ones place, the tens place, the hundreds place, or the thousands place for each numeral by holding up the appropriate number of fingers.

Materials

Introduction:

1. 3 orange juice cans or containers labeled ones, tens, hundreds

2. 10 each of red, blue, and green popsicle sticks

Day 1:

1. Red, blue, and green popsicle sticks for each student
2. Matching cards for Concentration game

Example: 329 matches tens

Day 2:

1. Orange popsicle sticks for each student
2. Additional cards for Concentration game which include the thousands place

Example: 1248 matches thousands

Culmination:

1. Flash cards with numerals up to 9,999.

Sample Tests**Test 1**

Directions: Look at the underlined digit. In which place is the underlined digit? Choose the letter of the correct answer and mark it on your answer sheet.

1. 918

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

2. 1,037

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

3. 742

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

4. 3,655

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

5. 382

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

6. 990

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

7. 4,641

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

8. 7,086

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

9. 9,834

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

10. 227

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

Sample Tests**Test 2**

Directions: Look at the underlined digit. In which place is the underlined digit? Choose the letter of the correct answer and mark it on your answer sheet.

1. 9,99

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

2. 325

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

3. 660

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

4. 1,234

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

5. 411

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

6. 2,778

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

7. 8,462

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

8. 945

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

9. 5,567

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

10. 283

- (a) ones
- (b) tens
- (c) hundreds
- (d) thousands

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.2

Identify number words through thousands.

Explanation of objective

Identify number words greater than 10 but less than 10,000 by selecting the matching numerals.

Prerequisite Skills (descending order)

- (a) Identify numerals 1,000 to 9,999.
- (b) Identify number words through hundreds.
- (c) Identify numerals 100 to 999.
- (d) Identify number words through 99.
- (e) Identify numerals 0 to 99.
- (f) Identify number words 11 through 20.
- (g) Identify numerals 11 to 20.
- (h) Identify number words 0 through 10.
- (i) Identify numerals 0 to 10.

Vocabulary

word name

word names for numbers from ten through nine thousand, nine hundred ninety-nine

Lesson Plan Outline

Introduction:

Show a numeral card with the numeral "25" on it. Say "twenty-five." Then write the words "twenty-five" on the board. Point out that just as every person has a word name so does every number. Show other numeral cards up to 99 and follow the same procedure. Call attention to the hyphen separating the tens and ones. Have a few students write the word names for some of the other numerals on the board.

Activities:

Day 1:

1. Give each student either a card showing a numeral or a card showing a word name

for a number. Tell students they must match the numerals with their word names. Each student must find the person holding the card that matches his/her own card. When a match is made, the two students must sit down. When all matches have been made, let each group read its numeral and show its word name. Collect the cards, mix them, and distribute them again making sure that no student receives a card he has had before. Play the game again. Repeat the game two or three times.

2. Have pairs of students use the red and blue popsicle sticks described in TM Math -3.1 so that one student represents numbers with the sticks and the other student writes the numeral and its word name.

Day 2:

1. Extend the Introduction activity to include numbers and their word names to 999.
2. Play a relay game where each team is given an identical set of cards (one card per team member) showing word names for numbers to 999. When a number from the cards is called, the person from each team holding the card must go to the board and write that number on the board and return to his/her place. The first to finish scores a point for his/her team. The team with the most points at the end of the game wins.
3. Extend Activity #2 Day 1 to include the green popsicle sticks.

Day 3:

1. Extend the Introduction activity to include numbers and their word names to 9,999.
2. Play the matching game described in Activity #1 Day 1 but include numbers to 9,999.
3. Extend Activity #3 Day 2 to include the orange popsicle sticks.

Culmination:

Check students' understanding of word names for numbers by writing a word name on the board and having students write the corresponding numeral on their own individual chalkboards or blank 3 x 5 cards. Students should show the number they have written so that a quick assessment can be made.

Materials

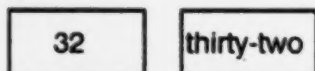
Introduction:

1. Cards showing numerals to 99

Day 1:

1. Pairs of cards where one card shows a numeral to 99 and its match shows the word name for the number

Example:



2. Red and blue popsicle sticks

Day 2:

1. Cards showing numerals to 999
2. Two identical sets of cards showing word names for numbers to 999
3. Red, blue, and green popsicle sticks

Day 3:

1. Cards showing numbers to 9,999
2. Pairs of cards where one card shows a numeral to 9,999 and its match shows the word name for the number
3. Red, blue, green, and orange popsicle sticks

Culmination:

Individual chalkboards and chalk or a set of 3 x 5 cards for each student.

Sample Tests**Test 1**

Directions: Choose the numeral that matches the word name. Mark the letter of your choice on the answer sheet.

1. Two hundred sixty-nine

- (a) 269
- (b) 279
- (c) 2,069
- (d) 20,069

2. Seventy-three

- (a) 17
- (b) 70
- (c) 703
- (d) 73

3. Five thousand one hundred sixteen

- (a) 5,160
- (b) 5,016
- (c) 5,116
- (d) 50,116

4. Forty-eight

- (a) 40
- (b) 48
- (c) 14
- (d) 408

5. Nine hundred three

- (a) 93
- (b) 903
- (c) 9,003
- (d) 913

6. Six thousand fifty-five

- (a) 6,055
- (b) 655
- (c) 6,050
- (d) 60,055

7. Two thousand nine hundred nineteen

- (a) 2,999
- (b) 2,019
- (c) 2,919
- (d) 2,900

8. Eighty-seven

- (a) 80
- (b) 807
- (c) 870
- (d) 87

9. Forty-two

- (a) 40
- (b) 402
- (c) 420
- (d) 42

10. One thousand three hundred seventy

- (a) 1,370
- (b) 1,376
- (c) 10,376
- (d) 13,076

Sample Tests**Test 2**

Directions: Choose the numeral that matches the word name. Mark the letter of your choice on the answer sheet.

1. Eight hundred four

- (a) 84
- (b) 804
- (c) 8,004
- (d) 840

2. Fifty-six

- (a) 50
- (b) 506
- (c) 560
- (d) 56

3. Twelve

- (a) 12
- (b) 20
- (c) 22
- (d) 10

4. Seven thousand six

- (a) 7,060
- (b) 706
- (c) 76
- (d) 7,006

5. Four thousand two hundred fourteen

- (a) 4,240
- (b) 40,214
- (c) 4,214
- (d) 4,204

6. Thirty-five

- (a) 30
- (b) 35
- (c) 305
- (d) 3,005

7. Nine thousand eight hundred one

- (a) 9,801
- (b) 9,800
- (c) 90,801
- (d) 98,001

8. Six thousand thirty-seven

- (a) 60,037
- (b) 637
- (c) 6,037
- (d) 6,370

9. Eighty-one

- (a) 80
- (b) 801
- (c) 810
- (d) 81

10. Two hundred fifty-three

- (a) 2,053
- (b) 253
- (c) 250
- (d) 20,053

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.3

Use $<$, $>$, or $=$ to compare two numbers.

Explanation of Objective

Compare two numbers greater than 9 but less than 1,000 by selecting $<$, $>$, or $=$ to show the appropriate relationship between the given numbers.

Prerequisite Skills (descending order)

- (a) Identify the numbers coming before, between or after given numbers 100-999.
- (b) Compare two numbers through 100 using $>$, $<$, and $=$.
- (c) Identify the numbers coming before, between or after given numbers 0-99.
- (d) Identify place value of a given digit in a three-digit numeral.
- (e) Identify numerals 100 to 999.
- (f) Identify the place value of a given digit in a two-digit numeral.
- (g) Identify numerals 0 to 99.
- (h) Identify the equivalent or non-equivalent set when two or more sets are given.
- (i) Identify cardinal numbers to indicate how many objects are in a given set (11 to 20).
- (j) Count 0 to 50 objects using correct number names.
- (k) Identify cardinal numbers to indicate how many objects are in a given set (0 to 10).
- (l) Order 4 to 9 objects (smallest to largest, shortest to tallest).
- (m) Compare two objects by one property (taller and shorter, bigger and smaller).

Vocabulary

symbol
relationship
greater than
less than
equal to

Lesson Plan Outline

Introduction:

Use unifix cubes to show the numbers 7 and 4. Have the students count the number of cubes for each number. Then, ask if 7 and 4 are equal. Ask which is the larger number and why. Write $7 > 4$ on the chalkboard and say that it is read 7 is greater than 4. Ask which is the smaller number and why. Write $4 < 7$ on the chalkboard and say that it is read

4 is less than 7. Stress that the sign always points to the smaller number despite whether a greater than or less than sentence is being written. Represent two other numbers with unifix cubes and have one student write a greater than sentence and another student write a less than sentence with the numbers. Repeat this process several additional times using different numbers each time.

Activities

Day 1:

1. Have students work with a partner. Give them ten pairs of one-digit numerals. Have them write a greater than and a less than sentence for each set of numbers. Let them use unifix cubes for assistance.
2. When all students have completed Activity #1, have pairs of students write the two sentences for each set of numbers on the chalkboard. Have them explain the sentences and tell why using their unifix cubes.

Day 2:

1. Extend the Introduction Activity to demonstrate greater than and less than with two-digit numbers. Stress that with two-digit numbers the tens digits should always be examined first. If these digits are the same, then the ones digits should be examined.
2. Have pairs of students use numeral cards 10-99 and greater/less than symbol cards to play "Go Fish." During each student's turn, he/she should ask a question like the following: "Do you have a card greater than/less than 23 (The "23" Number card is being held by the player asking the question.)?" At this point, the other student should examine his/her cards and select one, if any, that fits the first student's description and give it to the student. Then, the first student must use a greater than/less than symbol card along with the two numeral cards to form a sentence. For example, if the first student asked for a card greater than 23 and got 61, he/she should select a greater than symbol card and place it in the following manner:

number card	symbol card	number card
61	>	23

If the second student does not have an appropriate card, then the first student must draw from the card pile. When all the cards have been used, the student with the larger number of greater than/less than sentences wins.

Day 3:

1. Extend the Introduction Activity to demonstrate greater than and less than with three-digit numbers. Stress that with three-digit numbers the hundreds digits should always

be examined first. If these digits are the same, then the tens digits should be examined. If the tens digits are the same, then the ones digits should be examined.

2. Give pairs of students two three-digit numeral cards each. Have them write a greater than sentence using the two numbers. When all have finished, students should go to the chalkboard, write the sentences and explain how they were formed.

3. Play a greater than/less than relay. Divide students into two teams and give each member of each team one three-digit number card. Write a three-digit number on the chalkboard -- the same number for each team. The first member of each team should examine his/her number, compare it to the number written on the board, write the number to the right side of the number on the board and write a greater than/less than sign between the numbers. The second member of each team should examine his/her number in comparison to the number written by the first member's number, and place a greater than/less than sign between the numbers. The other members of each team should continue likewise until all team members have finished. The first team finished with all signs correct wins.

Culmination:

Show students greater than/less than sentences with some of them true and some false. Have students show one finger if the sentence is true and two fingers if it is false.

Materials

Introduction

1. Eleven unifix cubes

Day 1:

1. Ten pairs of one-digit numerals duplicated on paper for each group of students
2. Unifix cubes for each pair of students

Day 2:

1. Ten pairs of two-digit numerals duplicated on paper for each group of students.
2. Unifix cubes
3. Numeral cards 10-99 to play "Go Fish" for each pair of students
4. Symbol cards showing $<$ and $>$

Day 3:

1. Ten pairs of two three-digit numerals duplicated on paper for each group of students
2. Unifix cubes
3. Two three-digit numeral cards for each pair of students
4. One three-digit numeral card for each student

Culmination:

1. A variety of greater than and less than sentences where some of the sentences are true and some are false

Sample Tests**Test 1**

Directions: Choose the symbol that shows the relationship between the given numbers. Mark the letter of your choice on the answer sheet.

1. $88 \square 808$

- (a) $<$
- (b) $=$
- (c) $>$

2. $717 \square 77$

- (a) $<$
- (b) $=$
- (c) $>$

3. $848 \square 818$

- (a) $<$
- (b) $=$
- (c) $>$

4. $267 \square 672$

- (a) $<$
- (b) $=$
- (c) $>$

5. $39 \square 40$

- (a) $<$
- (b) $=$
- (c) $>$

6. $555 \square 515$

- (a) $<$
- (b) $=$
- (c) $>$

7. $442 \square 441$

- (a) $<$
- (b) $=$
- (c) $>$

8. $72 \square 70$

- (a) $<$
- (b) $=$
- (c) $>$

9. $23 \square 32$

- (a) $<$
- (b) $=$
- (c) $>$

10. $50 \square 60$

- (a) $<$
- (b) $=$
- (c) $>$

Sample Tests**Test 2**

Directions: Choose the symbol that shows the relationship between the given numbers. Mark the letter of your choice on the answer sheet.

1. 99 ☐ 98

- (a) <
(b) =
(c) >

2. 10 ☐ 100

- (a) <
(b) =
(c) >

3. 101 ☐ 111

- (a) <
(b) =
(c) >

4. 337 ☐ 337

- (a) <
(b) =
(c) >

5. 56 ☐ 65

- (a) <
(b) =
(c) >

6. 187 ☐ 178

- (a) <
(b) =
(c) >

7. 122 ☐ 221

- (a) <
(b) =
(c) >

8. 603 ☐ 630

- (a) <
(b) =
(c) >

9. 456 ☐ 456

- (a) <
(b) =
(c) >

10. 404 ☐ 40

- (a) <
(b) =
(c) >

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.4

Use the symbols $+$, $-$, $\times$, $\div$, or $\square$.

Explanation of Objective

Select the operation represented by the symbol $+$, $-$, $\times$, $\div$, or $\square$ in simple problems with numbers of no more than 3 digits in addition and subtraction problems and no more than 2 digits in multiplication and division problems.

Prerequisite Skills (descending order)

- (a) Divide a one-digit number by a one-digit number with and without remainders.
- (b) Identify the word -- division -- and its respective symbol.
- (c) Multiply one-digit numbers.
- (d) Identify the word -- multiplication -- and its respective symbol.
- (e) Subtract one-digit numbers.
- (f) Identify the word -- subtraction -- and its respective symbol.
- (g) Add one-digit numbers.
- (h) Identify the word -- addition -- and its respective symbol.

Vocabulary

symbol
operation
addition
plus
subtraction
minus
multiplication
times
division
divided by

Lesson Plan Outline

Introduction:

Write the following on the chalkboard: $31 + 43$. Point to the symbol (i.e., the addition sign) and ask students what it means. Then ask what operation would have to be performed to work the exercise. Write the name of the operation on the board. Follow the same procedure with these exercises:

$$52 - 17$$

$$14 \times 2$$

$$25 \div 5$$

$$8 \overline{)40}$$

Follow the same procedure with additional exercises.

Activities:

Day 1:

1. Given 20 number sentences, have students work in pairs identifying the operation required to work each sentence.
2. Provide number cards and symbol cards (i.e., +, -, x, ÷ and $\overline{\hspace{1cm}}$) to each pair of students. Have students take turns with one student forming a number sentence with the cards and the other student identifying the operation required.

Day 2:

1. Repeat Activity #2 Day 1 but require that different pairs of students work together.

Culmination:

Provide students four cards each with the following words -- addition, subtraction, multiplication, and division. Display a number sentence requiring one operation. Have students show the card with the appropriate operation.

Materials

Introduction:

1. Chalk
2. Chalkboard

Activities:

Day 1:

1. Twenty exercises with 5 being addition sentences, 5 subtraction, 5 multiplication, and 5 division

2. Number cards with no more than 3 digits

3. Cards with symbols $+$, $-$, $\times$, $\div$, and $\square$

Day 2:

1. Number cards with no more than 3 digits

2. Cards with symbols $+$, $-$, $\times$, $\div$, and $\square$

Culmination:

1. Four cards for each student with these words – addition, subtraction, multiplication, and division.

Sample Tests**Test 1**

Directions: Select the operation indicated by the symbol in each exercise. Mark the letter of the answer on your answer sheet.

1. $98 + 7$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

2. $5 \overline{) 35}$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

3.
$$\begin{array}{r} 22 \\ - 2 \\ \hline \end{array}$$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

4.
$$\begin{array}{r} 244 \\ + 21 \\ \hline \end{array}$$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

5.
$$\begin{array}{r} 66 \\ \times 4 \\ \hline \end{array}$$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

6. $24 \div 4$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

7. $111 - 33$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

8. $2 \overline{) 18}$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

9. 5×14

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

10.
$$\begin{array}{r} 49 \\ - 7 \\ \hline \end{array}$$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

Sample Tests**Test 2**

Directions: Select the operation indicated by the symbol in each exercise. Mark the letter of the answer on your answer sheet.

1. $65 - 25$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

2. 37×7

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

3.
$$\begin{array}{r} 84 \\ -41 \\ \hline \end{array}$$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

4. $4 \overline{)16}$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

5. $12 \div 3$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

6. $213 + 13$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

7.
$$\begin{array}{r} 12 \\ \times 4 \\ \hline \end{array}$$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

8.
$$\begin{array}{r} 25 \\ +34 \\ \hline \end{array}$$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

9. $5 \overline{)15}$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

10.
$$\begin{array}{r} 20 \\ -7 \\ \hline \end{array}$$

- (a) addition
- (b) subtraction
- (c) multiplication
- (d) division

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.5

Identify fractional parts from halves through fifths.

Explanation of Objective

Identify fractional parts from halves through fifths by selecting the fraction illustrated by a given drawing where fractional parts have been shaded.

Prerequisite Skills (descending order)

- (a) Identify a shape that is divided into fifths from a given group of divided shapes.
- (b) Identify a shape that is divided into thirds from a given group of divided shapes
- (c) Identify a shape that is divided into fourths from a given group of divided shapes.
- (d) Identify a shape that is divided into half from a group of divided shapes.
- (e) Identify a circle, square, and rectangle from a given group of shapes.

Vocabulary

fraction
fractional part
equal parts
shaded
half
third
fourth
fifth

Lesson Plan Outline

Introduction:

Show students 1 stick of butter or modeling clay. Say, "This stick of butter/clay is 1 whole stick." Write on the board 1 stick of butter/clay = 1 whole beside a rectangle representing the butter/clay. Tell them that 1 whole can be divided into equal parts which are the same size and the same shape. Demonstrate this by cutting the butter/clay into halves and drawing a corresponding line to separate the butter/clay on the board. Say that now you have two equal parts or two halves and write two parts = two halves on the board beside the butter/clay. Use other sticks to demonstrate 1 whole being divided into thirds, fourths, and fifths. Stress that for all parts except halves the number of parts determines the name of the parts (i.e., three parts are thirds, four parts are fourths, and five parts are fifths). Use transparencies to show other examples of halves, thirds, fourths, and fifths. Have students identify the number of parts and the name of the parts. Additionally, show

pictures of objects that are divided, but not divided into equal parts and discuss why they do not show halves, thirds, fourths, or fifths.

Activities:

Day 1:

1. Provide students with four pies drawn on paper - one pie per sheet of paper. Lines should be drawn on the pies so that one pie shows halves, one shows thirds, one shows fourths, and one shows fifths. Have students work in pairs and cut the pies into halves, thirds, fourths, and fifths. One side of each piece should be labeled with the name of the piece (e.g., each piece of the pie that has been divided into thirds should have the word "third" written on it). Once students have completed labeling all parts, have pairs of students show their parts, name them, and tell how the parts got their names. Give each student an envelope in which to save their parts for later use.

2. Have students use cuisenaire rods to deepen their understanding of halves, thirds, fourths, and fifths. Use the white, red, green, purple, and yellow rods. Students should work in pairs to discover how many white rods it takes to make a red rod; a green rod; a purple rod; and a yellow rod. After each discovery, students should record their findings. For example, two white rods make one red rod. Therefore, students should record the following: 1 red rod = 2 white rods. After students have recorded all of their findings, have students share. Then, guide students to see that 1 red rod = 2 white rods or 2 equal parts or 2 halves; 1 light green rod = 3 white rods or 3 equal parts or 3 thirds; 1 purple rod = 4 equal parts or 4 fourths; and 1 yellow rod = 5 equal parts or 5 fifths.

Day 2:

1. Extend Activity #2 Day 1 to demonstrate fractional parts equal to $\frac{1}{2}$, $\frac{2}{2}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{3}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$ and $\frac{5}{5}$. For example, use one light green rod and three white rods to show $\frac{1}{3}$. First, show that 1 light green rod = 3 white rods. Then, show one white rod and ask how many thirds you have. When the students say one, write $\frac{1}{3}$ on the board. Say that $\frac{1}{3}$ is a fraction and that all numbers written this way are fractions. Stress that the top number (the numerator) is the number you are holding and that the bottom number (the denominator) is the total number of equal parts.

2. Have students work in pairs using cuisenaire rods. One student should pick a fraction for the other to demonstrate from a list of fractions being studied (i.e., $\frac{1}{2}$, $\frac{2}{2}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{3}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$ and $\frac{5}{5}$). The student demonstrating should show the rod that equals a whole first, next the white rods that equal that whole, and then the number of white rods that will show the fraction. For example, the first student chooses $\frac{3}{4}$ as the fraction for the other student to demonstrate. The other student finds the purple rod as the whole first, finds four white rods to equal the whole next, and then shows three of the white rods to represent $\frac{3}{4}$. Students should take turns choosing the fraction.

Day 3: (Time required: 50 minutes)

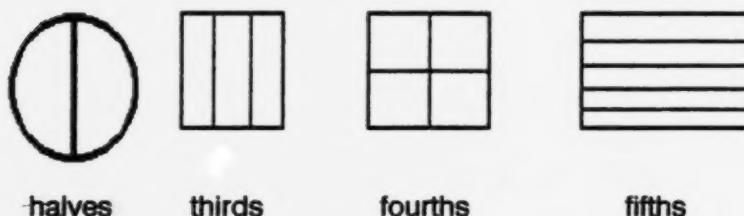
1. Draw a square divided into fourths on the chalkboard. Shade two of the parts and ask how many parts are shaded. After students respond, write 2 on the board. Then, ask how many parts are in all. After response, write a 4 under the 2 and draw a line between the two numbers so that students now see $\frac{2}{4}$ on the board. Say that $\frac{2}{4}$ of the square is shaded. Demonstrate with other geometric shapes representing different fractions.
2. Have students use the pies that they cut apart and labeled in Activity #1 Day 1. With pairs of students working together, students should take turns with one student coloring some of the parts of each pie and piecing each of the pies back together and the other student writing the fraction represented by each pie.
3. Have pairs of students use five different attribute blocks or cardboard representations of attribute blocks to answer questions such as the following: What fraction of these blocks of attribute blocks is blue? What fraction of these blocks is not blue? What fraction of these blocks is square? After all pairs have answered the questions, have them share their findings and explain how, and why they arrived at their particular answers.

Culmination:

Show geometric shapes with shaded parts. For each shape, have students show the appropriate fraction card for the shaded parts.

Materials**Introduction:**

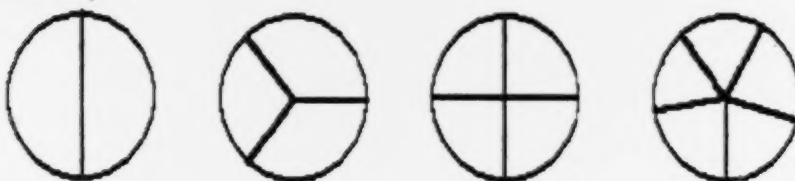
1. Four or five sticks of butter (refrigerate) or sticks of modeling clay
2. Transparencies showing shapes that have been divided into halves, thirds, fourths, and fifths.

Example:**Day 1:**

1. Handout for each student showing four pies – one showing halves, one showing

thirds, one showing fourths, and one showing fifths.

Example:



2. Scissors

3. One envelope for each student

Day 2:

1. Cuisenaire rods for each pair of students

2. A list of the 14 fractions being studied (i.e., $\frac{1}{2}$, $\frac{2}{2}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{3}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$ and $\frac{5}{5}$.) for each student

Day 3:

1. Pieces of pies placed in envelopes by each student in Activity #1 Day 1

2. Magic markers or crayons for each pair of students

3. Attribute blocks or cardboard representations of attribute blocks where no two have all the same attributes. There needs to be at least one thing different between any two blocks (i.e., size, shape, color, etc.)

Example:



(Although this example shows only diamonds, a variety of geometric shapes should be used.)

Culmination:

1. Pictures of geometric shapes with shaded parts

2. Fraction cards showing the 14 fractions (i.e., cards with $\frac{1}{2}$, $\frac{2}{2}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{3}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$ and $\frac{5}{5}$.) for each student.

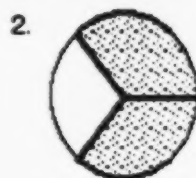
Sample Tests

Test 1

Directions: Look at the drawing. Select the fractional part that is shaded in the drawing. Mark the letter of your answer on the answer sheet.



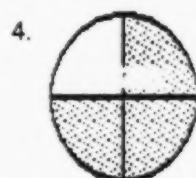
- (a) $\frac{1}{4}$
 (b) $\frac{2}{4}$
 (c) $\frac{4}{4}$
 (d) $\frac{4}{2}$



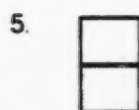
- (a) $\frac{2}{3}$
 (b) $\frac{3}{2}$
 (c) $\frac{2}{4}$
 (d) $\frac{2}{5}$



- (a) $\frac{1}{4}$
 (b) $\frac{3}{4}$
 (c) $\frac{2}{3}$
 (d) $\frac{1}{3}$



- (a) $\frac{4}{3}$
 (b) $\frac{1}{4}$
 (c) $\frac{3}{4}$
 (d) $\frac{3}{5}$



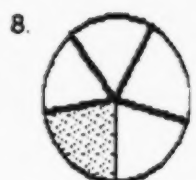
- (a) $\frac{3}{2}$
 (b) $\frac{2}{3}$
 (c) $\frac{1}{3}$
 (d) $\frac{1}{2}$



- (a) $\frac{3}{5}$
 (b) $\frac{3}{2}$
 (c) $\frac{2}{3}$
 (d) $\frac{5}{3}$



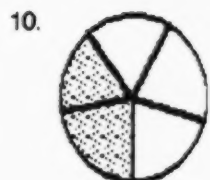
- (a) $\frac{1}{5}$
 (b) $\frac{1}{3}$
 (c) $\frac{1}{4}$
 (d) $\frac{3}{4}$



- (a) $\frac{4}{5}$
 (b) $\frac{1}{5}$
 (c) $\frac{5}{4}$
 (d) $\frac{1}{4}$



- (a) $\frac{1}{4}$
 (b) $\frac{3}{5}$
 (c) $\frac{5}{4}$
 (d) $\frac{4}{5}$



- (a) $\frac{5}{2}$
 (b) $\frac{2}{3}$
 (c) $\frac{2}{5}$
 (d) $\frac{3}{2}$

Sample Tests

Test 2

Directions: Look at the drawing. Select the fractional part that is shaded in the drawing. Mark the letter of your answer on the answer sheet.

1.



- (a) $\frac{1}{5}$
 (b) $\frac{4}{5}$
 (c) $\frac{5}{5}$
 (d) $\frac{5}{4}$

2.



- (a) $\frac{5}{2}$
 (b) $\frac{2}{3}$
 (c) $\frac{3}{2}$
 (d) $\frac{2}{5}$

3.



- (a) $\frac{1}{4}$
 (b) $\frac{3}{4}$
 (c) $\frac{1}{5}$
 (d) $\frac{1}{3}$

4.



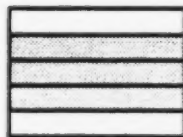
- (a) $\frac{1}{5}$
 (b) $\frac{4}{5}$
 (c) $\frac{5}{4}$
 (d) $\frac{1}{4}$

5.



- (a) $\frac{1}{3}$
 (b) $\frac{2}{2}$
 (c) $\frac{2}{3}$
 (d) $\frac{1}{2}$

6.



- (a) $\frac{5}{3}$
 (b) $\frac{2}{3}$
 (c) $\frac{3}{5}$
 (d) $\frac{3}{2}$

7.



- (a) $\frac{1}{3}$
 (b) $\frac{2}{3}$
 (c) $\frac{3}{3}$
 (d) $\frac{1}{4}$

8.



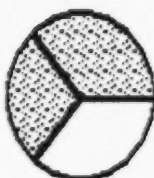
- (a) $\frac{4}{3}$
 (b) $\frac{3}{4}$
 (c) $\frac{1}{4}$
 (d) $\frac{3}{5}$

9.



- (a) $\frac{1}{4}$
 (b) $\frac{4}{4}$
 (c) $\frac{2}{4}$
 (d) $\frac{4}{2}$

10.



- (a) $\frac{3}{2}$
 (b) $\frac{2}{4}$
 (c) $\frac{2}{5}$
 (d) $\frac{2}{3}$

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.6

Add through 3-digit whole numbers, regrouping as necessary.

Explanation of Objective

Add one-, two-, or three-digit whole numbers with two or three addends in each problem, regrouping as necessary (only one regrouping per problem).

Prerequisite Skills (descending order)

- (a) Add two two-digit numbers with and without regrouping.
- (b) Indicate instant recall for basic addition facts with sums 11-19.
- (c) Add one- and two-digit numbers without regrouping.
- (d) Indicate instant recall for the basic addition facts with sums no larger than 10.
- (e) Combine two sets and indicate the number of elements in the combined set (not to exceed ten).

Vocabulary

addition
add
plus
addend
sum

Lesson Plan Outline

Introduction:

Write 42 on the chalkboard. Remind students that the ones should be added first, then +23 the tens. Add the following to what you have written on the board.

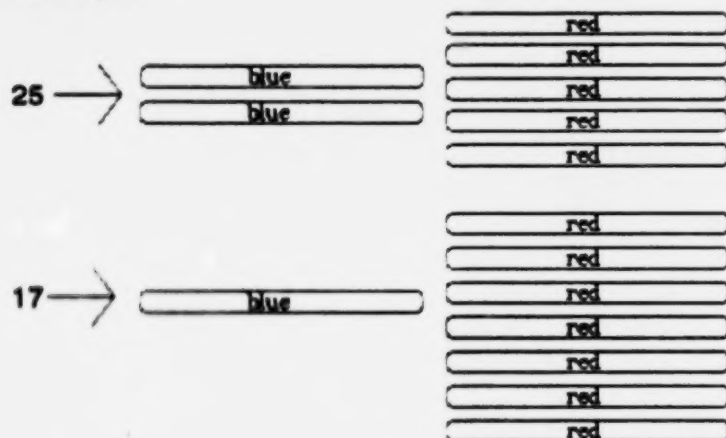
42	4 tens + 2 ones	-- or --	42
+23	2 tens + 3 ones		+23
6 tens + 5 ones = 65			65

Demonstrate the subtracting of these numbers with the red and blue popsicle sticks used in Module 3.1 to represent the ones and tens. Additionally, demonstrate by drawing the popsicle sticks on the board, coloring with red and blue colored chalk and then

demonstrate the adding of these numbers with the red and blue popsicle sticks used in TM 3.1 to represent the ones and tens. Additionally, demonstrate by drawing the popsicle sticks on the board, coloring with red and blue colored chalk and then adding them. Now, write the following on the board:

$$\begin{array}{r} 25 = 2 \text{ tens} + 5 \text{ ones} \\ +17 = 1 \text{ tens} + 7 \text{ ones} \\ \hline \end{array}$$

Also, draw red and blue popsicle sticks on the board to represent the ones and the tens. For example:



Ask how many ones there are. Then ask if 1 ten or 1 blue stick can be used in place of 10 of the ones or 10 of the red sticks. Draw a ring around 10 of the red sticks and draw an extra blue stick to represent the exchange. For example:



Use the red popsicle sticks to reinforce students' understanding of the exchange. Ask how many ones are left and how many tens there are now. Then, write the following on the board and demonstrate the correct procedure for adding:

$$\begin{array}{r}
 25 = 2 \text{ tens} + 5 \text{ ones} \\
 +17 = 1 \text{ tens} + 7 \text{ ones} \\
 \hline
 3 \text{ tens} + 12 \text{ ones} = 3 \text{ tens} + 1 \text{ ten} + 2 \text{ ones} = 4 \text{ tens} + 2 \text{ ones} = 42
 \end{array}$$

-- or --

$$\begin{array}{r}
 \text{(1 ten)} \\
 25 = 2 \text{ tens} + 5 \text{ ones} \\
 +17 = 1 \text{ tens} + 7 \text{ ones} \\
 \hline
 3 \text{ tens} + 12 \text{ ones} = 42
 \end{array}
 \quad \text{or} \quad
 \begin{array}{r}
 25 \\
 +17 \\
 \hline
 42
 \end{array}$$

Continue to use popsicle sticks to demonstrate the adding of other two-digit numbers with regrouping.

Activities:

Day 1:

1. Given ten exercises involving the addition of two two-digit numbers with regrouping, students should work in pairs and use red and blue popsicle sticks to find the answers. Students should take turns working each exercise with one student arranging the sticks in a manner to find the answer and the other student drawing a pictorial illustration of the popsicle sticks on paper. Also, they should take turns finding and explaining the answers. Optional: Have students verify each answer through the use of a calculator. If the calculator answer is different, then students should go back and re-work the exercise (Note: Students must be proficient in using a calculator in order to employ it in this manner.).
2. After students have worked all of the exercises in Activity #1 Day 1, have some of the pairs of students show on the chalkboard what they did and explain why they did it. Have them illustrate with the popsicle sticks, too.

Day 2:

1. Have pairs of students play a version of Tic Tac Toe. The first student to play should draw a card from a deck of two two-digit addition exercises with regrouping. Then, the student should find the answer to the exercise using the red and blue popsicle sticks, if necessary, and blank paper. The answer should be verified with the correct answer written on the back of the card or with a calculator. If it is correct, the student gets to place an X or O on the Tic Tac Toe board. Then, the other student's turn begins. The game continues until one student has three X's or O's in a row and wins. Repeat the game two or three times, but with different students working together.
2. Have pairs of students use a pair of die to play an adding game. The first student to play rolls the dice once and uses the two numbers rolled to form a two-digit number. This number should be written on a piece of paper. The same student rolls the dice again, forms a two-digit number, and writes it in column form under the first number. Then, he/she adds the two numbers together. The answer is the score that the student

receives and should be recorded under his/her name. Then the other student's turn begins and he/she should follow the same procedure. After this first round is completed, the student with the highest score receives one point. Additional rounds should be played until one of the students has 5 points and wins the game. The score pad for each student might look as follows:

Name Round Score Points Name Round Score Points

John	1	37	0
	2	48	1
	3	64	1
	4	22	0
	5	100	1
	6	85	1
	7	74	1

Sue	1	46	1
	2	21	0
	3	55	0
	4	86	1
	5	92	0
	6	44	0
	7	38	0

*John is the winner with 5 points after 7 rounds.

Day 3:

1. Extend the Introduction activity to demonstrate the addition of two and three three-digit numbers with only one regrouping per exercise. Also, use the green popsicle sticks from TM 3.1 to represent the hundreds.
2. Adapt Activity #1 Day 1 to include the addition of two and three three-digit numbers with only one regrouping per exercise. Use the green popsicle sticks from TM 3.1 to represent the hundreds.
3. Follow the same procedure as was followed in Activity #2 Day 1, but adapt it to correspond with Activity #2 Day 3.

Day 4:

1. Have pairs of students play Tic Tac Toe as in Activity #1 Day 2, but adapt the game to include the addition of two- and three-digit numbers with only one regrouping per exercise. Green popsicle sticks from TM 3.1 may be used to represent the hundreds.
2. Have pairs of students play the adding game described in Activity #2 Day 4, but adapt it by using a third die so that three-digit numbers may be formed (Note: Teacher may need to provide assistance if more than one regrouping occurs.)

Culmination:

Check students' understanding of adding up to three three-digit numbers by showing students five exercises, one at a time, that have been written on 3 x 5 cards. After each exercise is shown, have students work the exercises on paper write the answers on blank 3 x 5 cards, and display them.

Materials**Introduction:**

1. Red and blue popsicle sticks
2. Red and blue colored chalk

Day 1:

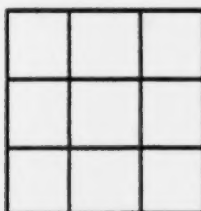
1. Ten exercises involving the addition of two two-digit numbers with regrouping
2. Red and blue popsicle sticks
3. Blank paper for each student
4. Calculator for each pair of students (optional)

Day 2:

1. A deck of cards showing two two-digit addition exercises with regrouping
2. Red and blue popsicle sticks
3. Blank paper for each student
4. Calculator for each pair of students (optional)
5. Tic Tac Toe boards which have been duplicated onto paper

For example:

Tic Tac Toe



6. X and O cards which are the same size as the squares on the Tic Tac Toe boards
7. A pair of die for each pair of students
8. A score pad that has been duplicated onto paper for each student. For example:

Name	Round	Score	Points

Day 3:

1. Red, blue, and green popsicle sticks
2. Red, blue, and green colored chalk
3. Ten exercises involving the addition of two and three three-digit numbers with only one regrouping
4. Blank paper for each student
5. Calculator for each pair of students (optional)

Day 4:

1. A deck of cards showing a two or three three-digit addition exercises with only one regrouping
2. Red, blue, and green popsicle sticks
3. Blank paper for each student
4. Calculator for each pair of students (optional)
5. Tic Tac Toe boards which have been duplicated onto paper
6. X and O cards which are the same size as the squares on the Tic Tac Toe boards
7. Three die for each pair of students
8. A score pad that has been duplicated onto paper for each student

Culmination:

1. Five addition exercises up to three three-digit numbers written on 3 x 5 cards
2. Blank paper for each student
3. Blank 3 x 5 cards for each student

Sample Tests**Test 1**

Directions: Add and mark the letter of your answer on the answer sheet.

1. $7 + 6$

- (a) 1
- (b) 13
- (c) 42
- (d) 7

2. 329

$$\begin{array}{r} 404 \\ + 21 \\ \hline \end{array}$$

- (a) 744
- (b) 704
- (c) 7,414
- (d) 754

3. $\begin{array}{r} 69 \\ + 21 \\ \hline \end{array}$

- (a) 90
- (b) 88
- (c) 98
- (d) 48

4. $810 + 92$

- (a) 9,102
- (b) 882
- (c) 902
- (d) 1,730

5. $52 + 53$

- (a) 55
- (b) 100
- (c) 582
- (d) 105

6. 533

$$\begin{array}{r} 30 \\ + 46 \\ \hline \end{array}$$

- (a) 609
- (b) 509
- (c) 603
- (d) 5,109

7. $9 + 8$

- (a) 1
- (b) 17
- (c) 72
- (d) 18

8. 47

$$\begin{array}{r} + 81 \\ \hline \end{array}$$

- (a) 126
- (b) 46
- (c) 128
- (d) 857

9. $\begin{array}{r} 3 \\ + 9 \\ \hline \end{array}$

- (a) 3
- (b) 27
- (c) 13
- (d) 12

10. $66 + 18$

- (a) 52
- (b) 84
- (c) 1,146
- (d) 74

Sample Tests**Test 2**

Directions: Add and mark the letter of your answer on the answer sheet.

1.
$$\begin{array}{r} 8 \\ + 8 \\ \hline \end{array}$$

- (a) 0
- (b) 1
- (c) 16
- (d) 17

2.
$$\begin{array}{r} 119 \\ 625 \\ + 43 \\ \hline \end{array}$$

- (a) 787
- (b) 587
- (c) 777
- (d) 8,717

3. $25 + 92$

- (a) 107
- (b) 77
- (c) 73
- (d) 117

4.
$$\begin{array}{r} 733 \\ + 96 \\ \hline \end{array}$$

- (a) 863
- (b) 729
- (c) 7,129
- (d) 829

5.
$$\begin{array}{r} 81 \\ + 9 \\ \hline \end{array}$$

- (a) 88
- (b) 90
- (c) 80
- (d) 810

6. $280 + 302 + 125$

- (a) 707
- (b) 7,107
- (c) 763
- (d) 607

7.
$$\begin{array}{r} 448 \\ + 49 \\ \hline \end{array}$$

- (a) 487
- (b) 497
- (c) 4,817
- (d) 4,017

8.
$$\begin{array}{r} 71 \\ + 33 \\ \hline \end{array}$$

- (a) 44
- (b) 1,004
- (c) 104
- (d) 42

9. $56 + 26$

- (a) 712
- (b) 30
- (c) 72
- (d) 82

10.
$$\begin{array}{r} 47 \\ + 103 \\ \hline \end{array}$$

- (a) 1,410
- (b) 150
- (c) 144
- (d) 1,510

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.7

Subtract through 3-digit whole numbers, regrouping as necessary.

Explanation of Objective

Subtract one-, two-, or three-digit whole numbers, regrouping as necessary (only one regrouping per problem).

Prerequisite Skills (descending order)

- (a) Subtract two-digit numbers with and without regrouping.
- (b) Indicate instant recall of basic subtraction facts with minuends 11-19.
- (c) Indicate instant recall for the basic subtraction facts with minuends no larger than 10.
- (d) Subtract one-digit numbers.
- (e) Separate 1 to 10 elements from a given set no larger than 10 and indicate the number of remaining elements.

Vocabulary

multiplication
multiply
times
product
multiplicand
multiplier

Lesson Plan Outline

Introduction:

Write 87 on the chalkboard. Remind students that the ones should be subtracted first, then the tens. Add the following to what you have written on the board.

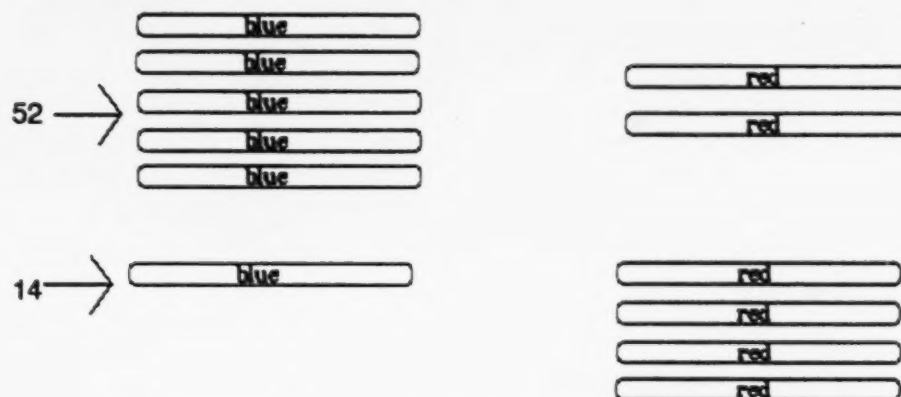
$$\begin{array}{r} 87 \\ -23 \\ \hline \end{array} \quad \begin{array}{l} 8 \text{ tens} + 7 \text{ ones} \\ 2 \text{ tens} + 3 \text{ ones} \\ \hline 6 \text{ tens} + 4 \text{ ones} = 64 \end{array} \quad \begin{array}{l} \text{-- or --} \\ 87 \\ -23 \\ \hline 64 \end{array}$$

Demonstrate the subtracting of these numbers with the red and blue popsicle sticks used in Module 3.1 to represent the ones and tens. Additionally, demonstrate by drawing the popsicle sticks on the board, coloring with red and blue colored chalk and then subtract-

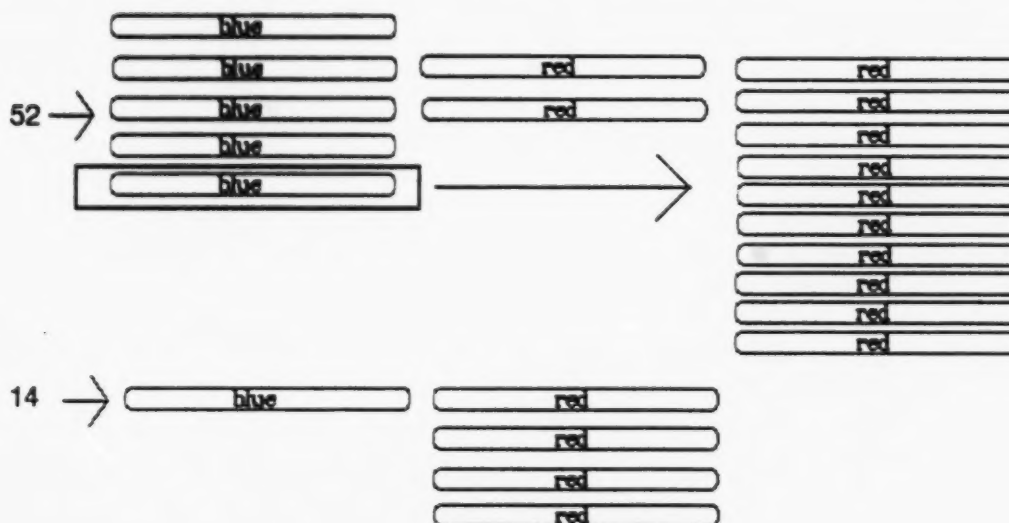
ing them. Now, write the following on the board:

$$\begin{array}{r} 52 = 5 \text{ tens} + 2 \text{ ones} \\ - 14 = 1 \text{ tens} + 4 \text{ ones} \\ \hline \end{array}$$

Also, draw red and blue popsicle sticks on the board to represent the ones and the tens. For example:



Attempt to subtract the ones. Ask students what is $2 - 4$. If they answer 2, then demonstrate with popsicle sticks that this answer is impossible. Then ask if one blue popsicle stick or one ten can be exchanged for ten red popsicle sticks or ten ones. Demonstrate how this can be done on the board with the original drawing of popsicle sticks. Stress that the exchange must always be done using the top number or the minuend. For example:



Use the real popsicle stick to reinforce students' understanding of the exchange. Ask how many ones and tens there are now. Then, write the following on the board and demonstrate the correct procedure for subtracting:

$$\begin{array}{l}
 52 = 5 \text{ tens} + 2 \text{ ones} = 4 \text{ tens} + 1 \text{ ten} + 2 \text{ ones} = 4 \text{ tens} + 12 \text{ ones} \\
 -14 = 1 \text{ ten} + 4 \text{ ones} = 1 \text{ ten} + 4 \text{ ones} = 1 \text{ ten} + 4 \text{ ones} \\
 \hline
 3 \text{ tens} + 8 \text{ ones} = 38
 \end{array}$$

or

$$\begin{array}{r}
 \begin{array}{r}
 \text{(4) (10+2)} \\
 52 \\
 -14 \\
 \hline
 38
 \end{array}
 \quad
 \begin{array}{r}
 4 \text{ 12} \\
 52 \\
 -14 \\
 \hline
 38
 \end{array}
 \quad
 \begin{array}{r}
 4 \text{ 1} \\
 52 \\
 -14 \\
 \hline
 38
 \end{array}
 \end{array}$$

Continue to use popsicle sticks to demonstrate the subtracting of other two-digit numbers with regrouping.

Activities:

Day 1:

1. As an additional reinforcement to students' understanding of the exchange of tens for ones or the renaming of tens, have pairs of students play Concentration. A match should consist of one card showing the same number but in its renamed form. For example:

T	O		T	O
5	2	matches	4	12

2. Have pairs of students play a Claim the Square game. The game board should be a 4 x 4 grid. Students are to take turns drawing a card with a two-digit subtraction exercise with regrouping on it. The student that draws the card should work the exercise using blank paper and popsicle sticks, if necessary. Answers should be verified by having the correct answer written on the back of each card or by the use of a calculator. If the answer is correct, then the student may claim any square on the grid by placing a dried bean on the square (Note: the two sets of dried beans must be different colors.). When all of the squares have been claimed, the game ends. The winner is the student that has claimed the most squares.

Day 2:

1. Have pairs of students play a subtraction game using a deck of 60 cards with numbers 0 - 9 written on them (i.e., six cards will have 0 written on them, six cards will have 1 written on them, six cards will have 2 written on them, etc). The dealer must deal himself and the other player four cards face down. Each player should turn over the cards, write two two-digit numbers, and subtract the smaller number from the larger number. The player with the higher score wins the round and one point. Scores should be verified by students checking one another or by the use of a calculator. The first player to win three rounds or three points wins the game. Scores can be recorded on score pads such as those described in Module 3.6, Activity #2 day 2.
2. Have pairs of students use a 3 x 3 grid and eight cards showing one two-digit

subtraction exercise with regrouping per card. Each exercise should have a two-digit minuend and a two-digit subtrahend. In each square except one, an appropriate answer to one of the exercises should be written. In one square, write a number that is an inappropriate answer to all exercises. As students work the exercises, have them color the squares showing the appropriate answer. One square should not be colored (i.e., the one with the inappropriate answer to all exercises). The square not colored is a magic square that corresponds to a $+ab$ or a 3×5 card divider in a card file. Behind the divider one card should be placed which contains a special message such as "Good work!". Although the eight exercises which have an answer on the grid may be the same for each pair of students, use a variety of numbers for the magic squares making sure that there are corresponding card dividers and cards in the card file. (Note: If students cannot find the number left in their magic squares in the card file, then they will know they have made a mistake.)

Day 3:

1. Extend the Introduction activity to show subtraction exercises with a three-digit minuend and a three-digit subtrahend. Each exercise should involve only one regrouping. Use the red, blue, and green popsicle sticks from TM 3.1 along with red, blue, and green colored chalk.
2. Reinforce students' understanding of the exchange of hundreds for tens by having pairs of them play Concentration. Match cards as suggested in Activity #1 Day 1. For example:

H	T	O	matches	H	T	O
5	2	8		4	12	8

3. Play the Claim the Squares game described in Activity #2 Day 1 but use three-digit subtraction exercises with only one regrouping on the cards.

Day 4:

1. Play the subtraction game from Activity #1 Day 2 but have the dealer deal himself and the other player six cards each. Players should form two three-digit numbers and subtract the smaller number from the larger number.
2. Have students play the Magic Square game described in Activity #2 Day 2. Adapt the eight exercises so that subtraction exercises with a three-digit minuend, a three-digit subtrahend, and only one regrouping are used.

Culmination:

Check students' understanding by having each student work five subtraction exercises using two- and three-digit whole numbers with only one regrouping per exercise.

Materials

Introduction:

1. Red and blue popsicle sticks
2. Red and blue colored chalk

Day 1:

1. Cards to match in a Concentration game with one card showing a number and the other card showing the same number but in its renamed form (Only two-digit numbers should be used.) For example:

T	O		T	O
4	3	matches	3	13

2. A 4 x 4 grid for each pair of students
3. Cards showing subtraction exercises with two-digit minuends, two-digit subtrahends, and regrouping (Optional: Answers may be written on backs of cards.) For example:

Front	Back (optional)
$\begin{array}{r} 72 \\ -26 \\ \hline \end{array}$	46

4. Blank paper
5. Red and blue popsicle sticks
6. Two sets of dried beans that are different colors (e.g. one set could be brown pinto beans and the other set could be red kidney beans)
7. Calculator (optional)

Day 2:

1. A deck of 60 cards with numerals 0 - 9 written on them -- six cards will have 0 on it, six cards will have 1 on it, six cards will have 2 on it, etc.
2. Blank paper for each student
3. A score pad for each student from TM 3.6, Activity #2 Day 2. For example:

Name	Round	Score	Points

4. Eight cards showing one subtraction exercise with regrouping per card for each pair of students. Exercises should have two-digit minuends and two-digit subtrahends. For example:

75
-58

5. A 3 x 3 grid for each pair of students showing the eight answers to the eight exercises in Materials #4 Day 2 (One of the squares in the grid should show an answer inappropriate for any of the exercises.) For example:

19	35	26
79	28	63
17	24	22

1. $\begin{array}{r} 45 \\ -19 \\ \hline \end{array}$

2. $\begin{array}{r} 92 \\ -29 \\ \hline \end{array}$

3. $\begin{array}{r} 55 \\ -38 \\ \hline \end{array}$

4. $\begin{array}{r} 64 \\ -36 \\ \hline \end{array}$

5. $\begin{array}{r} 73 \\ -49 \\ \hline \end{array}$

6. $\begin{array}{r} 46 \\ -27 \\ \hline \end{array}$

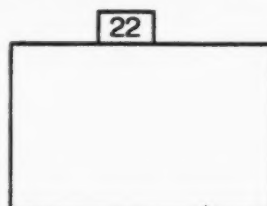
7. $\begin{array}{r} 98 \\ -19 \\ \hline \end{array}$

8. $\begin{array}{r} 81 \\ -46 \\ \hline \end{array}$

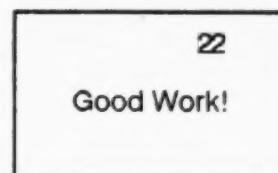
Solution

		22

Card File Divider



Card Behind Divider



Day 3:

1. Red, blue, and green popsicle sticks
2. Red, blue, and green colored chalk
3. Cards to match in a Concentration game with one card showing a numeral and the other card showing the same numeral but in its renamed form (only three-digit numerals should be used.)

For example:

H	T	O
9	1	7

matches

H	T	O
8	11	7

4. A 4 x 4 grid for each student
5. Cards showing subtraction exercises with three-digit minuends, three-digit subtrahends and only one regrouping (Optional: Answers may be written on backs of cards.)

For example:

Front

Back
(Optional)

$\begin{array}{r} 327 \\ -154 \\ \hline \end{array}$
--

173

Day 4:

1. A deck of 60 cards with numbers 0 - 9 written on them -- six cards will have 0 on them, six cards will have 1 on them, etc.
2. Blank paper for each student
3. A score pad for each student from TM 3.6, Activity #2 Day 2 For example:

Name	Round	Score	Points

4. Eight cards showing one subtraction exercise with only one regrouping per card for each pair of students. Exercises should have three-digit minuends and three-digit subtrahends. For example:

$\begin{array}{r} 644 \\ -227 \\ \hline \end{array}$
--

5. A 3 x 3 grid for each pair of students showing the eight answers to the eight exercises in Materials #4 Day 4 (One of the squares in the grid should show an answer inappropriate for any of the exercises.) Refer to materials #5 Day 2 for more detail.

Culmination:

1. Five subtraction exercises with two- and three-digit minuends, two- and three-digit subtrahends and only one regrouping per exercise for each student

Sample Tests**Test 1**

Directions: Subtract and mark the letter of your answer on the answer sheet.

1.
$$\begin{array}{r} 498 \\ - 29 \\ \hline \end{array}$$

- (a) 471
- (b) 469
- (c) 479
- (d) 208

2.
$$\begin{array}{r} 207 \\ - 109 \\ \hline \end{array}$$

- (a) 98
- (b) 108
- (c) 102
- (d) 198

3. $32 - 17 =$

- (a) 29
- (b) 49
- (c) 25
- (d) 15

4. $556 - 8 =$

- (a) 552
- (b) 576
- (c) 458
- (d) 548

5.
$$\begin{array}{r} 944 \\ - 117 \\ \hline \end{array}$$

- (a) 833
- (b) 837
- (c) 827
- (d) 737

6.
$$\begin{array}{r} 50 \\ - 16 \\ \hline \end{array}$$

- (a) 44
- (b) 34
- (c) 43
- (d) 46

7.
$$\begin{array}{r} 22 \\ - 3 \\ \hline \end{array}$$

- (a) 19
- (b) 21
- (c) 29
- (d) 25

8. $833 - 24 =$

- (a) 819
- (b) 811
- (c) 809
- (d) 709

9.
$$\begin{array}{r} 267 \\ - 176 \\ \hline \end{array}$$

- (a) 91
- (b) 191
- (c) 111
- (d) 93

10. $72 - 24 =$

- (a) 58
- (b) 48
- (c) 52
- (d) 42

Sample Tests**Test 2**

Directions: Subtract and mark the letter of your answer on the answer sheet.

1. $373 - 37 =$

- (a) 336
- (b) 346
- (c) 246
- (d) 236

2.
$$\begin{array}{r} 411 \\ - 81 \\ \hline \end{array}$$

- (a) 470
- (b) 430
- (c) 331
- (d) 330

3.
$$\begin{array}{r} 24 \\ - 5 \\ \hline \end{array}$$

- (a) 21
- (b) 19
- (c) 29
- (d) 20

4.
$$\begin{array}{r} 555 \\ - 136 \\ \hline \end{array}$$

- (a) 421
- (b) 429
- (c) 489
- (d) 419

5.
$$\begin{array}{r} 907 \\ - 161 \\ \hline \end{array}$$

- (a) 846
- (b) 766
- (c) 746
- (d) 868

6.
$$\begin{array}{r} 82 \\ - 28 \\ \hline \end{array}$$

- (a) 54
- (b) 56
- (c) 64
- (d) 66

7. $70 - 31 =$

- (a) 41
- (b) 39
- (c) 49
- (d) 101

8. $831 - 13 =$

- (a) 822
- (b) 844
- (c) 818
- (d) 728

9. $94 - 39 =$

- (a) 45
- (b) 55
- (c) 65
- (d) 63

10. $108 - 27 =$

- (a) 71
- (b) 121
- (c) 81
- (d) 301

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.8

Multiply using basic facts through 5×9 .

Explanation of Objective

Work multiplication exercises where the multiplicand is a one- or two-digit number, the multiplier is a one-digit number, the product is less than 100, and no regrouping occurs.

Prerequisite Skills (descending order)

- (a) Indicate instant recall of multiplication facts through 5×9 .
- (b) Add two- or three-digit numbers with and without regrouping.
- (c) Add two two-digit numbers with and without regrouping.
- (d) Skip count by 2's, 3's, 4's, and 5's to 50.
- (e) Indicate instant recall for basic addition facts with numbers 11-19.
- (f) Add one- and two-digit numbers without regrouping.
- (g) Indicate instant recall for the basic addition facts with sums no larger than 10.
- (h) Combine two sets, indicating number of elements in combined set (not to exceed ten).

Vocabulary

multiplication
multiply
times
product
multiplicand
multiplier

Lesson Plan Outline

Introduction:

Use 3 bundles of popsicle sticks with 5 sticks in each bundle. Ask students to find the total number of sticks. They may find the answer by counting, by adding, or by multiplying. Ask several students to explain how they got their answers. Write a number sentence for each explanation, stressing the relationship between counting, adding, and multiplying.

Activities:

Day 1:

1. Using objects other than popsicle sticks, repeat the procedure described in the

Introduction. Write addition and multiplication sentences to represent each arrangement of objects. Ask students why the multiplication sentences and the addition sentences mean the same (e.g., $4 \times 2 = 8$ means the same as $2 + 2 + 2 + 2 = 8$).

2. Have students work in pairs with one student arranging objects to represent multiplication sentences and the other student figuring out the sentence and writing it.
3. Use flash cards to continue practice in matching addition sentences and multiplication sentences.

Day 2:

1. Use transparencies with overlays to demonstrate the use of a multiplication table. After several examples of working exercises, have students explain how to work exercises before showing the overlays. Reverse this process by showing the overlays and having students state the number sentence.
2. Given blank multiplication tables, help students construct their own tables. Have students count by 1's, 2's, 3's, 4's, and 5's to fill in the table through 5×9 . Additionally, students should construct their own covers to use on the table. Covers will be used to "cover" all the squares not being used so that students can see the number of squares which represents the basic fact in question.
3. Given ten exercises and working in pairs, have students take turns working each exercise by explaining and demonstrating the procedure to follow in using the multiplication table.

Day 3:

1. Use dried beans as counters to work multiplication exercises through 5×9 . Verify answers by using multiplication tables constructed on Day 2. Key answers to letters. Use answers to decode a message.
2. Practice basic multiplication facts by playing Bingo where answers are written on student cards and exercises are written on the cards that the caller selects and reads.
3. Practice basic multiplication facts by matching groups of two puzzle pieces made from heavy cardboard. For each group, one piece should have an exercise on it and the other should have an answer.

Day 4:

1. Extend Activity #1 Day 1 to demonstrate the multiplication of a two-digit number by a one-digit number without regrouping. (Bundles of ten popsicle sticks could be used for the number in the tens place.) Additionally, use a place-value box to demonstrate tens and ones. Stress the correct placement of the numerals.

Example: Place-Value Box

tens	ones
3	2
x	3
9	6

2. Have pairs of students work exercises on the chalkboard. Exercises should involve the multiplication of two-digit numbers by one-digit numbers without regrouping. Given a 5 x 5 grid and eight exercises written vertically, have students work each exercise, record their answers under the exercises and color the boxes showing the appropriate answers. Construct the grid to show a specific design, such as a diamond, when students work all exercises correctly.

Day 5:

1. Extend Activity #2 Day 4 by having students construct their own grid design. Given a blank 5 x 5 grid and 20 exercises, have each student and a partner use at least 8 of the exercises to create a design on the grid. Possible designs include a square, rectangle, triangle, diamond, cross, and others. Have students show their creations and explain their procedure.

Culmination:

Check students' knowledge of basic multiplication facts by showing a flash card with an exercise on it. Have each student hold up his/her own numeral card with the appropriate answer on it.

Materials

Introduction:

1. Popsicle sticks

Day 1:

1. A variety of objects for counting such as marbles, pieces of gum, and markers
2. Flash cards

Example:

Front	Back
3 x 2	2 + 2 + 2

Day 2:

1. Transparency showing a multiplication table with overlays representing basic multiplication facts

Example:

Multiplication Table Transparency

x	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45

Multiplication Table Transparency with Overlay Transparency

x	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45

$$4 \times 8 = 32$$

2. Blank multiplication table for each student
3. Construction paper for making covers for multiplication tables

Example:

Multiplication Table with Cover

x	0	1	2	3	4	5	6	7
0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7
2	0	2	4	6	8	10	12	14

$$2 \times 7$$

4. Ten exercises to 5×9 and students' completed multiplication tables

Day 3:

1. Dried beans
2. Message to decode using basic multiplication facts:

Example

Code

Message: Have a good day.

A	24	H	28
D	18	O	12
E	40	V	35
G	9	Y	14

Word #1 $4 \times 7 = 28$ H $8 \times 3 = 24$ A $5 \times 7 = 35$ V $5 \times 8 = 40$ E
 Word #2 $6 \times 4 = 24$ A
 Word #3 $3 \times 3 = 9$ G $4 \times 3 = 12$ O $6 \times 2 = 12$ O $9 \times 2 = 18$ D
 Word #4 $6 \times 3 = 18$ D $4 \times 6 = 24$ A $2 \times 7 = 14$ Y

3. Bingo cards and markers

Example:

Player card

10	4	20
14	8	42
32	25	45

Caller Card

4×5

4. Groups of two matching puzzle pieces

Example: 6×6 36

Day 4:

1. 5×5 grid for each student with numerals in each box. Numerals in boxes forming design must be appropriate answers to problems given.

Grid with Solution

13	20	63	87	43
69	22	52	99	71
39	45	80	24	88
17	48	78	28	75
		64		

Problems

- | | | | |
|-------------|-------------|-------------|-------------|
| 1. 21
x3 | 3. 13
x3 | 5. 32
x2 | 7. 44
x2 |
| 2. 11
x2 | 4. 14
x2 | 6. 12
x4 | 8. 33
x3 |

Day 5:

1. Blank 5 x 5 grids for each student
2. Twenty multiplication exercises to 5 x 9

Culmination:

1. Flash cards with multiplication exercises to 5 x 9.
2. Student numeral cards with numerals to 5 (two-digit numbers up to 45 can be shown by using two numeral cards such as the "4" card and the "5" card to represent "45".)

Sample Tests**Test 1**

Directions: Multiply and mark your answer on the answer sheet.

1. $5 \times 6 =$

- (a) 11
- (b) 30
- (c) 25
- (d) 56

2. 21

$$\begin{array}{r} \times 3 \\ \hline \end{array}$$

- (a) 63
- (b) 24
- (c) 23
- (d) 53

3. $4 \times 7 =$

- (a) 24
- (b) 47
- (c) 11
- (d) 28

4. 3

$$\begin{array}{r} \times 9 \\ \hline \end{array}$$

- (a) 39
- (b) 27
- (c) 12
- (d) 72

5. 43

$$\begin{array}{r} \times 2 \\ \hline \end{array}$$

- (a) 45
- (b) 65
- (c) 86
- (d) 68

6. $5 \times 9 =$

- (a) 59
- (b) 14
- (c) 45
- (d) 36

7. $4 \times 4 =$

- (a) 8
- (b) 16
- (c) 12
- (d) 44

8. 20

$$\begin{array}{r} \times 4 \\ \hline \end{array}$$

- (a) 80
- (b) 24
- (c) 84
- (d) 64

9. $0 \times 6 =$

- (a) 6
- (b) 60
- (c) 16
- (d) 0

10. 5

$$\begin{array}{r} \times 5 \\ \hline \end{array}$$

- (a) 5
- (b) 20
- (c) 10
- (d) 25

Sample Tests**Test 2**

Directions: Multiply and mark your answer on the answer sheet.

1.
$$\begin{array}{r} 4 \\ \times 6 \\ \hline \end{array}$$

- (a) 24
- (b) 10
- (c) 46
- (d) 64

2. $3 \times 9 =$

- (a) 12
- (b) 39
- (c) 27
- (d) 93

3.
$$\begin{array}{r} 22 \\ \times 3 \\ \hline \end{array}$$

- (a) 25
- (b) 26
- (c) 55
- (d) 66

4. $5 \times 7 =$

- (a) 35
- (b) 57
- (c) 12
- (d) 75

5.
$$\begin{array}{r} 4 \\ \times 8 \\ \hline \end{array}$$

- (a) 12
- (b) 32
- (c) 48
- (d) 84

6.
$$\begin{array}{r} 14 \\ \times 2 \\ \hline \end{array}$$

- (a) 26
- (b) 18
- (c) 28
- (d) 16

7. $2 \times 9 =$

- (a) 29
- (b) 18
- (c) 11
- (d) 19

8.
$$\begin{array}{r} 11 \\ \times 5 \\ \hline \end{array}$$

- (a) 16
- (b) 15
- (c) 56
- (d) 55

9. $3 \times 0 =$

- (a) 0
- (b) 3
- (c) 30
- (d) 33

10.
$$\begin{array}{r} 33 \\ \times 3 \\ \hline \end{array}$$

- (a) 99
- (b) 39
- (c) 66
- (d) 69

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.9

Divide using basic facts through $45 \div 9$.

Explanation of Objective

Work division exercises using basic facts through $45 \div 9$. Divisors should be less than 10. Dividends must be two-digit whole numbers ≤ 45 . Quotients must be exact.

Prerequisite Skills (descending order)

- (a) Multiply two numbers using basic facts through 9×5 .
- (b) Subtract two-digit numbers with and without regrouping.
- (c) Add two two-digit numbers with and without regrouping.

Vocabulary

division
divide
divided by
dividend
divisor
quotient

Lesson Plan Outline:

Introduction:

Have a group of 6 students come to the front of the room. Tell the group to divide or separate themselves into groups of 2 students each. Ask how many groups there are. Write $6 \div 2 = 3$ on the chalkboard. Point to the number 6 and say that the first number tells how many in all. Point to the 2 and say that the second number tells how many in each group. Point to the 3 and say that the third number or the answer tells how many groups. Ask students to think about the division sentence on the board (i.e., $6 \div 2 = 3$) and see if they can make a division sentence for the next example. Have 2 more students come to the front of the room for a total of 8 students. Have students divide or separate themselves into groups of 4 students each. Ask how many groups there are. Then, ask if any student can identify the division sentence that will tell how the students were divided or separated. If no one knows, remind them that the first number in the sentence tells how many in all, the second number tells how many in each group, and the third number tells how many groups. If students are still having difficulty, write $8 \div 4 = 2$ on the board. Show several other examples following the same procedure described above. Remind students how

they used repeated addition to help them understand multiplication. Say that to help them understand division they will use repeated subtraction. Use the division number sentences written on the board earlier as examples. For example, $6 \div 2 = 3$ can be shown as follows:

$$6 - 2 = 4 - 2 = 2 - 2 = 0$$

3 groups of 2 each
 $6 \div 2 = 3$

-- or --

$$\begin{array}{r} 6 \\ -2 \\ \hline 4 \\ -2 \\ \hline 2 \\ -2 \\ \hline 0 \end{array}$$

3 groups of 2 each
 $6 \div 2 = 3$

If students have difficulty, use the first 6 students that came to the front of the room at the beginning of this activity to demonstrate. Ask students why the division sentences and the repeated subtraction sentences mean the same. Demonstrate additional examples.

Activities:

Day 1:

1. Use counters, popsicle sticks, dried beans, or other objects in the same way as students were used in the Introduction. Write division and repeated subtraction sentences to represent each arrangement of objects. Discuss why each set of sentences mean the same.
2. Use flash cards to continue practice in matching repeated subtraction and division sentences.

Day 2:

1. Practice basic division facts through $45 \div 9$ by matching groups of two puzzle pieces made from heavy cardboard. For each match, one piece should have an exercise on it and the other should have an answer. Encourage students to use counters to assist them. Additionally, encourage students to employ repeated subtraction for assistance. Also, show students how multiplication can help. For example, when students must work $18 \div 6$, they can think $\underline{\quad} \times 6 = 18$.
2. Practice basic division facts by playing Bingo where answers are written on student cards and exercises are written on the cards that the caller selects and reads. Since only the numbers 0 - 9 may be used on the student cards, several students may Bingo at the same time. One way to avoid this is to use some of the same numbers more than once on each student card making sure that no two student cards are exactly alike. Encourage the use of repeated subtraction and/or multiplication for assistance.
3. Use dried beans as counters to work division exercises through $45 \div 9$. Key answers

to letters. Use answers to decode a message (Refer to Materials Day #2 for example.)

Day 3:

1. Now that students are familiar with division facts through $45 \div 9$, show them how to write the horizontal division sentences in vertical form to solve (e.g., $9 \overline{)45}$). Point out that whether a division sentence is written vertically or horizontally, it means the same. Stress the correct placement of the quotient. Show several examples.

2. Given a 4×4 grid and eight exercises through $45 \div 9$ written horizontally, have pairs of students write the exercises vertically, work the exercises, record the answers, and color the boxes in the grid showing the appropriate answers. Construct the grid to show a specific design, such as a rectangle, when students work all exercises correctly.

3. Extend Activity #2 Day 3 by having students construct their own grid design. Given a blank 5×5 grid and 20 division exercises to $45 \div 9$, have pairs of students use at least 8 of the exercises to create a design on the grid. Possible designs include a square, rectangle, triangle, cross, and others. Have students show their creations and explain their procedures.

Culmination:

Check students' knowledge of basic division facts by showing one flash card at a time with an exercise on it. Have each student display his/her own numeral cards showing the appropriate answer for each exercise.

Materials

Introduction:

1. Groups of students

Day 1:

1. A variety of objects such as counters, popsicle sticks, and dried beans
2. Flash cards

Example:

Front

Back

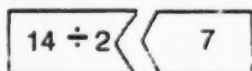
$$12 \div 4$$

$$12 - 4 = 8 - 4 = 4 - 4 = 0$$

Day 2:

1. Groups of two matching puzzle pieces

Example:



2. Exercises to demonstrate the relationship between multiplication and division
3. Bingo cards and markers

Example:

Player Card

Caller Card

6	5	7
2	3	6
5	8	9

$25 \div 5$

4. Dried beans
5. Messages to decode using basic division facts

Example:

Code

Message: Good morning.

9	D	2	N
5	G	4	O
7	I	3	R
8	M		

Word #1	$15 \div 3 = 5$ G	$20 \div 5 = 4$ O	$12 \div 3 = 4$ O	$45 \div 5 = 9$ D
Word #2	$32 \div 4 = 8$ M	$16 \div 4 = 4$ O	$15 \div 5 = 3$ R	$10 \div 5 = 2$ N
	$28 \div 4 = 7$ I	$18 \div 9 = 2$ N	$25 \div 5 = 5$ G	

Day 3:

1. 4 x 4 grid for each pair of students with numerals in each box - numerals in boxes forming design must be appropriate answers to problems given.

Grid with Solution

Problems

12	10	14	20
3	8	9	2
6	4	7	5
1	11	0	15

1. $24 \div 8 = \underline{\quad}$
2. $35 \div 7 = \underline{\quad}$
3. $21 \div 3 = \underline{\quad}$
4. $36 \div 4 = \underline{\quad}$
5. $30 \div 5 = \underline{\quad}$
6. $16 \div 2 = \underline{\quad}$
7. $18 \div 9 = \underline{\quad}$
8. $12 \div 3 = \underline{\quad}$

2. Blank 4 x 4 grids for each pair of students
3. Twenty division exercises to $45 \div 9$

2. Student cards with numerals 0 - 9

Culmination:

1. Flash cards with division exercises to $5 \div 9$
2. Student numeral cards with numerals to 5 (two-digit numbers up to 45 can be shown by using two numeral cards such as the "4" and the "5" card to represent "45".)

Sample Tests**Test 1**

Directions: Divide and mark the letter of your answer on the answer sheet.

1. $8 \overline{)40}$

- (a) 5
- (b) 6
- (c) 20
- (d) 50

2. $5 \overline{)35}$

- (a) 70
- (b) 7
- (c) 13
- (d) 6

3. $18 \div 9 =$

- (a) 2
- (b) 3
- (c) 6
- (d) 9

4. $27 \div 3 =$

- (a) 30
- (b) 8
- (c) 24
- (d) 9

5. $12 \div 4 =$

- (a) 8
- (b) 4
- (c) 3
- (d) 30

6. $5 \overline{)25}$

- (a) 6
- (b) 23
- (c) 20
- (d) 5

7. $2 \overline{)16}$

- (a) 80
- (b) 8
- (c) 9
- (d) 14

8. $16 \div 4 =$

- (a) 4
- (b) 12
- (c) 20
- (d) 40

9. $18 \div 3 =$

- (a) 15
- (b) 6
- (c) 21
- (d) 20

10. $4 \overline{)32}$

- (a) 13
- (b) 9
- (c) 8
- (d) 80

Sample Tests**Test 2**

Directions: Divide and mark the letter of your answer on the answer sheet.

1. $9 \overline{)45}$

- (a) 5
- (b) 6
- (c) 36
- (d) 50

2. $7 \overline{)42}$

- (a) 60
- (b) 35
- (c) 16
- (d) 6

3. $36 \div 6 =$

- (a) 30
- (b) 66
- (c) 6
- (d) 60

4. $24 \div 8 =$

- (a) 4
- (b) 3
- (c) 30
- (d) 16

5. $10 \div 2 =$

- (a) 5
- (b) 12
- (c) 15
- (d) 20

6. $6 \overline{)12}$

- (a) 6
- (b) 2
- (c) 16
- (d) 18

7. $2 \overline{)14}$

- (a) 12
- (b) 16
- (c) 7
- (d) 70

8. $20 \div 5 =$

- (a) 4
- (b) 15
- (c) 25
- (d) 40

9. $21 \div 7 =$

- (a) 30
- (b) 28
- (c) 14
- (d) 3

10. $6 \overline{)30}$

- (a) 24
- (b) 5
- (c) 36
- (d) 50

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.10

Identify circles, triangles, rectangles, or squares.

Explanation of Objective

Identify a circle, triangle, rectangle, or square by matching the figure with its name.

Prerequisite Skills (descending order)

- (a) Reproduce a given pattern.
- (b) Classify objects by one property (size, shape, color, use).

Vocabulary

circle
triangle
rectangle
square
side
corner

Lesson Plan Outline

Introduction:

Draw a square, a rectangle, a triangle and a circle on the chalkboard. Ask students to tell how the shapes are alike and how they are different. If students have difficulty, point out the number of sides and corners. Write the number of sides and corners beside each shape. Then, write the names of the shapes beside the shapes on the board. Point out the unique characteristics of each shape. For example, a triangle has three sides and three corners and can be formed by connecting any three dots as long as the dots are not in a straight line. Have students name at least one item that is square, one item that is rectangular, one item that is triangular, and one item that is circular.

Activities:

Day 1:

1. Have pairs of students use geoboards and rubber bands to form squares, triangles, and rectangles (Rectangles and triangles may be formed various different ways.) Have students take turns showing what they made and telling how they made them.

2. Have various-sized circular items which students can trace to form circles. Have students construct a picture using these circles of various sizes (e.g., a snowman can be constructed using three circles of different sizes).

Day 2:

1. Extend the Introduction activity by having pairs of students locate and list items in the classroom that are square, rectangular, triangular, and circular.
2. When students have completed their lists in Activity #1 Day 2, have them show and describe some of the items on their lists that are square, triangular, rectangular, and circular. Discuss each item.

Day 3:

1. Have circles, rectangles, triangles, and squares (use several different kinds of rectangles and triangles) duplicated on paper. Also have the words "rectangle", "triangle", "square", and "circle" written on the paper. Have pairs of students race to see who can match all the shapes with their names first.

Culmination:

Check students' understanding by showing a shape and having them show the shape's appropriate name. Each student should have four 3 x 5 cards with the names of the shapes being studied written on them.

Materials

Day 1:

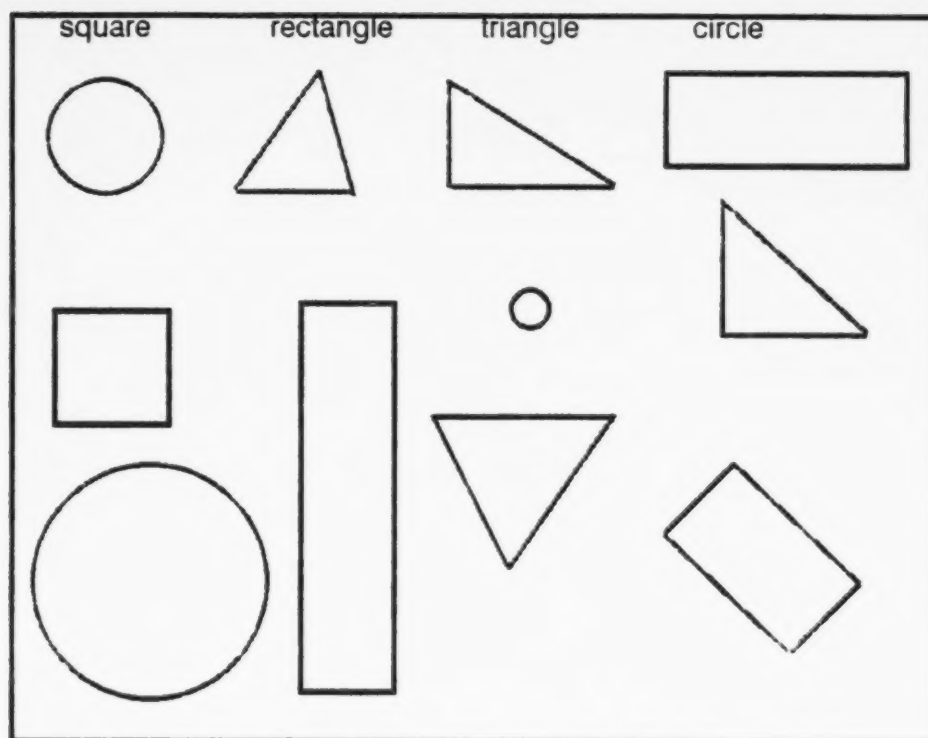
1. A geoboard and several rubber bands for each student
2. Various-sized circular items which students can trace to form circles (e.g., jar lids, coins, rims of drinking glasses, etc.)

Day 2:

1. Paper and pencil for each student

Day 3:

1. Circles, rectangles, triangles, and squares (use several different kinds of rectangles and triangles) duplicated on paper along with their corresponding names for each student -- students will match each shape to its appropriate name. An example of this worksheet is as follows:



Culmination:

1. Circles, rectangles, triangles, and squares drawn on 3 x 5 cards to show students
2. Four 3 x 5 cards per student with the names of the shapes being studied written on them

Sample Tests**Test 1**

Part I Directions: Look at the picture. Which shape does it represent? Mark the letter of your answer on the answer sheet.

1.



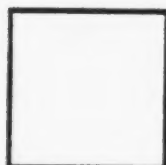
- (a) circle
- (b) rectangle
- (c) triangle
- (d) square

2.



- (a) circle
- (b) rectangle
- (c) triangle
- (d) square

3.



- (a) circle
- (b) rectangle
- (c) triangle
- (d) square

4.



- (a) circle
- (b) rectangle
- (c) triangle
- (d) square

5.



- (a) circle
- (b) rectangle
- (c) triangle
- (d) square

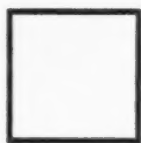
Test 1 (cont.)

Part II Directions: Read the question. Choose a shape. Mark the letter of your answer on the answer sheet.

1. Which of these pictures is a circle?



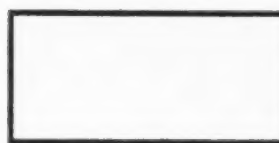
(a)



(b)

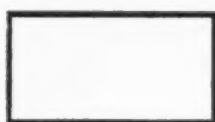


(c)



(d)

2. Which of the pictures is a triangle?



(a)



(b)



(c)

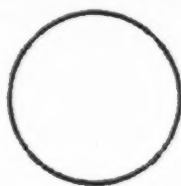


(d)

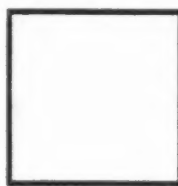
3. Which of these pictures is a rectangle?



(a)



(b)

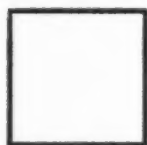


(c)

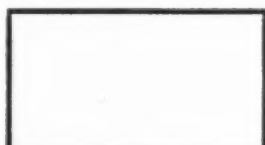


(d)

4. Which of these pictures is a square?



(a)



(b)



(c)

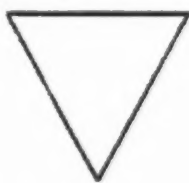


(d)

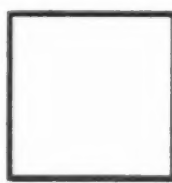
5. Which of these pictures is a triangle?



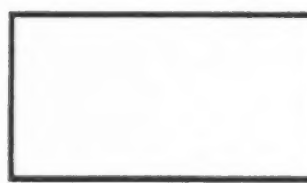
(a)



(b)



(c)

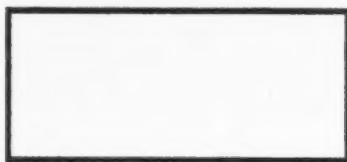


(d)

Sample Tests**Test 2**

Part I Directions: Look at the picture. Which shape does it represent? Mark the letter of your answer on the answer sheet.

1.



- (a) circle
- (b) rectangle
- (c) triangle
- (d) square

2.



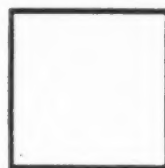
- (a) circle
- (b) rectangle
- (c) triangle
- (d) square

3.



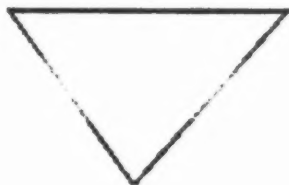
- (a) circle
- (b) rectangle
- (c) triangle
- (d) square

4.



- (a) circle
- (b) rectangle
- (c) triangle
- (d) square

5.



- (a) circle
- (b) rectangle
- (c) triangle
- (d) square

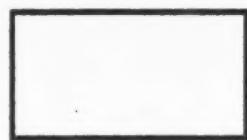
Test 2 (cont.)

Part II Directions: Read the question. Choose a shape. Mark the letter of your answer on the answer sheet.

1. Which of these pictures is a rectangle?



(a)



(b)



(c)



(d)

2. Which of the pictures is a triangle?



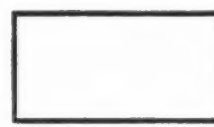
(a)



(b)

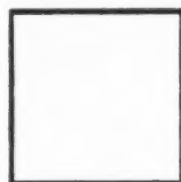


(c)



(d)

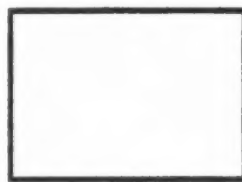
3. Which of these pictures is a circle?



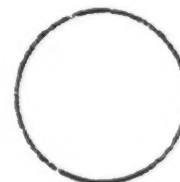
(a)



(b)



(c)



(d)

4. Which of these pictures is a square?



(a)



(b)



(c)



(d)

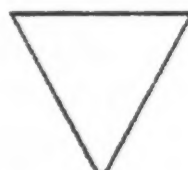
5. Which of these pictures is a rectangle?



(a)



(b)



(c)



(d)

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.11

Tell time to the hour, half hour, or quarter hour

Explanation of Objectives

Tell time to the nearest hour, half hour, or quarter hour by matching a clock illustration to the correct time. Times should be given without a.m. or p.m. designation (e.g., 8:55).

Prerequisite Skills (descending order)

- (a) Identify the correct time using pictures of clocks showing a specified time to the quarter hour.
- (b) Identify the correct time using pictures of clocks showing a specified time to the half hour.
- (c) Identify the correct time using pictures of clocks showing specified times to the hour
- (d) Count by 5's to 60.
- (e) Identify numerals 0 to 60.

Vocabulary

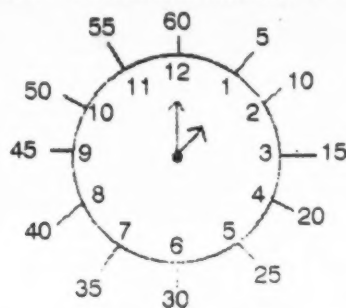
hour
half hour
quarter hour
minute
hour hand
minute hand

Lesson Plan Outline

Introduction:

Give each student his/her own clock to manipulate or have each construct his/her own. Show the students a demonstration clock that is displaying 12:00. Have students show the same time on their clocks. Identify the minute hand and hour hand. Demonstrate how the minute hand moves all the way around the clock in one hour. Have students manipulate their own clocks to show the same movement. Demonstrate that the hour hand moves from 12 to 1 to indicate one hour and that when another hour passes the hour hand moves from 1 to 2. Write on the board, 1 hour = 60 minutes, and say that when the minute hand has moved all the way around the clock 60 minutes has passed. Show several different times such as 1:00, 4:00, 6:00, 8:00, etc., have students show the same times on their clocks, and tell the time. Write the correct times in standard notation on the board stressing that the hour is to be written to the left of the colon and the minutes are

to be written to the right of the colon. Then, demonstrate the movement of the minute hand halfway around the clock and write on the board, one-half hour = 30 minutes. Show that 2 half hours or 30 minutes plus 30 minutes equals 60 minutes. Show several different times such as 1:30, 3:30, 5:30, 7:30, etc., have students show the same times on their clocks, and tell the times. Write the correct time in standard notation on the board. Next, cover one half of the clock with a sheet of paper and show that one half of a half hour or one half of 30 minutes is one-quarter hour or 15 minutes. Have students show the same on their clocks. Write on the board, one-quarter hour = 15 minutes. Show that there are four quarter hours in one hour and that 15 minutes plus 15 minutes plus 15 minutes plus 15 minutes equals 60 minutes. To increase students' understanding, draw a clock like the following on the board:



Say that simply starting with the numeral 1 on the clock and counting by fives will give the number of minutes after the hour that the minute hand is indicating. Demonstrate by showing 4:15, 4:30, and 4:45 on the demonstration clock. Have students show the same times on their clocks and count by fives to identify the correct time. Show many other similar times and follow the same procedure.

Activities:

Day 1:

1. Have groups of three students work together with one student being the dealer and the other two students being the players. Use 3 x 5 cards with clocks drawn showing various times (Refer to Explanation of Objective for criteria in construction of clocks.). On the backs of cards have the correct times written in standard notation. The dealer must show a card to the two players. The first player to say the correct time keeps the card until the end of the game. Then, the dealer shows another card and follows the same procedure. The player with the most cards at the end of the game wins.
2. Use groups of three students and 3 x 5 cards as in Activity #1 Day 1 but have various times written in standard notation on the cards instead of clocks. Have students use their clocks from the Introduction activity to see who can show the times on the cards displayed by the dealer first.

Day 2:

1. Use the cards constructed for Activity #1 and Activity #2 Day 1. Have pairs of students work together with each taking a turn drawing a card and either telling the time that the clock shows and writing it in standard notation or showing the time on the card

on his/her clock used during the Introduction activity. During each student's turn, he/she must explain to the other student how he/she arrived at his/her answer.

2. Follow the same procedure as was followed in Activity #1 Day 2 but have different pairs of students work together.

Day 3:

1. Divide the class into teams of five members each. Give each member of each team a 3 x 5 card with a clock drawn on it (Refer to Explanation of Objective for criteria for the construction of clocks.) Play a relay where each member must race to the chalkboard, write the time in standard notation that his/her clock is showing, and return to the back of the line. The first team to have all five times written on the board correctly wins (Note: No two team members within teams or among teams should have identical clocks.)

2. Play the relay again as in Activity #1 Day 3 but use different teams.

Culmination:

Check students' understanding by using the demonstration clock to display various times. Have students write the times on 3 x 5 cards and show them. Additionally, show students various times written on 3 x 5 cards, have students use their individual clocks to illustrate the times, and then, ask students to display the clocks.

Materials:

Note: Refer to Explanation of Objective for criteria for the construction of clocks.

Introduction:

1. A demonstration clock
2. An individual clock made from paper plates, construction paper, etc. for each student

Day 1:

1. 3 x 5 cards showing clocks displaying various times
2. 3 x 5 cards showing various times written in standard notation
3. Student clocks used in the Introduction activity

Day 2:

1. Both sets of cards constructed for Activity #1 and Activity #2 Day 1

2. Student clocks used in the Introduction activity

Day 3:

1. 3 x 5 cards showing various times - one for each student (No two team members within teams or among teams should have identical clocks.)

Culmination:

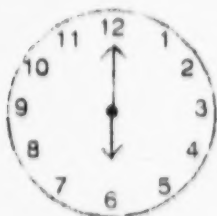
- 1. 3 x 5 cards from any of the previous activities with some showing various times written in standard notation and the demonstration clock from the Introduction activity
- 2. Student clocks used in the Introduction activity
- 3. Blank 3 x 5 cards for each student

Sample Tests

Test 1

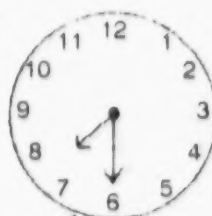
Part I Directions: Look at the clock. Find the correct time below. Mark the letter of your choice on the answer sheet.

1.



- (a) 6:00
- (b) 6:30
- (c) 12:00
- (d) 12:30

2.



- (a) 6:00
- (b) 6:30
- (c) 7:00
- (d) 7:30

3.



- (a) 9:45
- (b) 9:15
- (c) 3:45
- (d) 3:15

4.



- (a) 12:00
- (b) 12:15
- (c) 10:00
- (d) 10:15

5.



- (a) 2:45
- (b) 2:00
- (c) 9:15
- (d) 9:00

Test 1 (cont.)

Part II Directions: Find the correct clock below. Mark the letter of your answer on the answer sheet.

1. 12:45



(a)



(b)



(c)



(d)

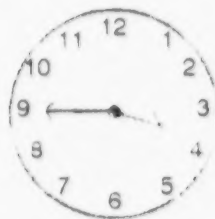
2. 3:15



(a)



(b)



(c)

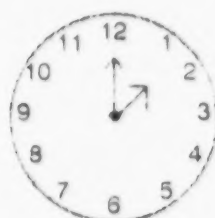


(d)

3. 1:30



(a)



(b)



(c)



(d)

4. 4:45



(a)



(b)



(c)



(d)

5. 5:00



(a)



(b)



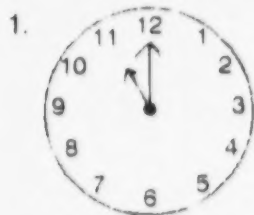
(c)



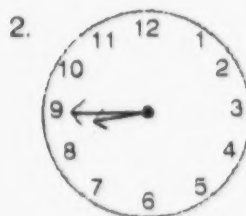
(d)

Sample Tests**Test 2**

Part I Directions: Look at the clock. Find the correct time below. Mark the letter of your choice on the answer sheet.



- (a) 11:00
- (b) 11:30
- (c) 12:00
- (d) 12:30



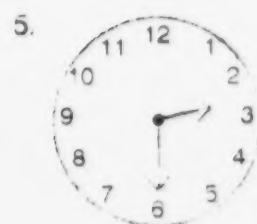
- (a) 8:00
- (b) 8:45
- (c) 9:00
- (d) 9:45



- (a) 3:15
- (b) 3:30
- (c) 5:15
- (d) 5:30



- (a) 5:30
- (b) 6:00
- (c) 6:30
- (d) 6:45



- (a) 6:00
- (b) 6:30
- (c) 2:00
- (d) 2:30

Test 2. (cont.)

Part II Directions: Find the correct clock below. Mark the letter of your answer on the answer sheet.

1. 1:45



(a)



(b)

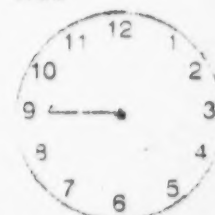


(c)



(d)

2. 4:30



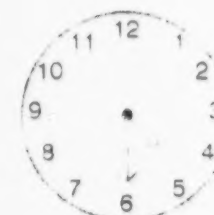
(a)



(b)



(c)

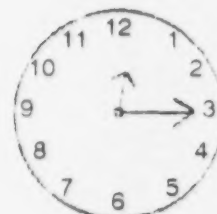


(d)

3. 3:00



(a)



(b)



(c)



(d)

4. 7:15



(a)



(b)



(c)



(d)

5. 9:45



(a)



(b)



(c)



(d)

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.12

Measure length to the nearest centimeter or inch.

Explanation of Objective

Measure length to the nearest centimeter or inch by selecting the correct length of an illustrated object.

Prerequisite Skills (descending order)

- (a) Identify the length of one centimeter.
- (b) Identify a centimeter ruler.
- (c) Identify the length of one inch.
- (d) Identify an inch ruler.
- (e) Identify numerals 0 to 99.

Vocabulary

centimeter
inch
unit of measure

unit of English measure
unit of metric measure

Lesson Plan Outline

Introduction

Have students use their feet, pencils, paper clips, and screws to measure several different items in the classroom (e.g. their desks, the chalkboard, a piece of paper, etc.). (Note: If the length is less than halfway between two numbers, use the smaller number. If the length is halfway or more between two numbers, use the larger number.) Have them record and compare their answers. Ask why their answers are different when they used different items with which to measure. Discuss the difficulties that may result from using different-sized objects with which to measure. Point out that when the same objects were used to measure a particular item, answers were the same. Guide the students to see that a standard unit of measure would be much more useful. For example, say the following: "Pretend that two friends wanted to compare their heights. One friend measured himself to be 12 pencils tall. The other friend measured himself to be 60 paper clips tall. How would the two friends know who was taller? Shorter? They would not know because pencils and paper clips are hard to compare. They are not the same length. On the other hand, if one friend was 12 pencils tall and the other friend was 10 pencils tall, then who is taller? Shorter? These questions are easier to answer because the same unit of

measure was used to measure both friends. One standard unit of metric measure that people use today is a centimeter. Use a centimeter ruler to illustrate the length of one centimeter on the chalkboard. Write the word "centimeter" on the board with its symbol, "cm". Give each student a centimeter ruler made from poster board and show the length of one centimeter, two centimeters, three centimeters, and so on. Demonstrate the correct measurement of an object by placing the edge of the ruler at the left edge of the object and measure. Draw horizontal and vertical line segments on the chalkboard. Have students take turns measuring the line segments and explaining how they arrived at their answers.

Activities:

Day 1:

1. Have pairs of students use their centimeter rulers and unifix cubes to practice measuring to the nearest centimeter. First, have them measure and record the length of 2 cubes, then 5 cubes, 10 cubes, and 20 cubes. As one pair of students finishes, they should find another pair of students that have also finished. These should compare their answers by having each one of the four illustrate how to measure one of the sets of cubes.
2. Have different pairs of students than in Activity #1 Day 1. Use unifix cubes for additional practice in measuring to the nearest centimeter. Students should take turns with one student putting together a set of unifix cubes and the other student measuring the set.

Day 2:

1. Adapt the Introduction activity to introduce another unit of measure - an English unit of measure - the inch. Provide inch rulers made from poster board for each student.

Use unifix cubes as in Activity #1 Day 1 to practice measuring to the nearest inch. Students should use their inch rulers.

3. Use unifix cubes as in Activity #2 Day 1 for additional practice in measuring to the nearest inch.

Day 3:

1. Give each student line segments of different lengths reproduced on paper. First, have students measure the line segments with their centimeter rulers and record the answers; then, measure with their inch rulers and record the answers. Have pairs of students compare their answers. If their answers are not the same for any line segment, then students should measure that line segment again to see where the mistake was made.
2. Give pairs of students a list of ten items in the classroom that they must measure both to the nearest centimeter and the nearest inch. Students should record their answers.

When all pairs have finished, have each pair demonstrate the measurement of at least one item from the list.

Culmination:

Give each student five line segments of different lengths reproduced on paper. First, have them measure the line segments with their centimeter rulers and then with their inch rulers. Students should record their answers.

Materials

Introduction:

1. Pencils, paper clips, and screws for each student
2. A centimeter ruler made from poster board for each student

Day 1:

1. Unifix cubes for each student
2. A centimeter ruler made from poster board for each student

Day 2:

1. An inch ruler made from poster board for each student
2. Unifix cubes for each student

Day 3:

1. Line segments of different lengths reproduced on paper for each student
2. A centimeter ruler for each student
3. An inch ruler for each student
4. A list of ten items to measure in the classroom

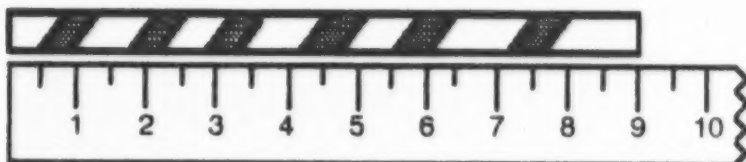
Culmination:

1. Line segments of different lengths reproduced on paper for each student
2. A centimeter ruler for each student
3. An inch ruler for each student

Sample Tests**Test 1**

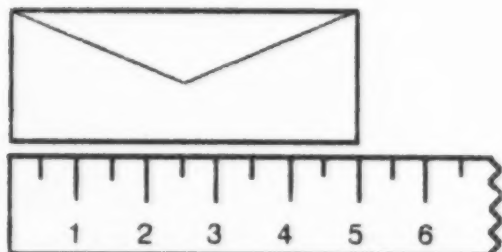
Part I Directions: Measure the length of each object to the nearest centimeter as shown by the metric ruler. Mark your answer on the answer sheet.

1.



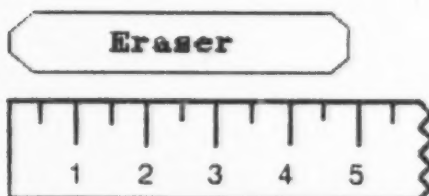
- (a) 7 centimeters
- (b) 8 centimeters
- (c) 9 centimeters
- (d) 10 centimeters

2.



- (a) 4 centimeters
- (b) 5 centimeters
- (c) 6 centimeters
- (d) 7 centimeters

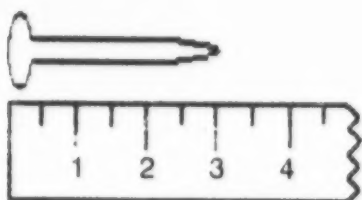
3.



- (a) 3 centimeters
- (b) 4 centimeters
- (c) 5 centimeters
- (d) 6 centimeters

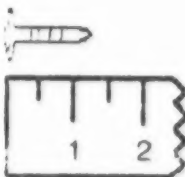
Test 1 (cont.)

4.



- (a) 2 centimeters
- (b) 3 centimeters
- (c) 4 centimeters
- (d) 5 centimeters

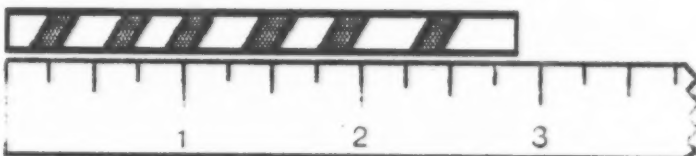
5.



- (a) 1 centimeter
- (b) 2 centimeters
- (c) 3 centimeters
- (d) 4 centimeters

Part II Directions: Measure the length of each object to the nearest inch as shown by the English ruler. Mark your answer on the answer sheet.

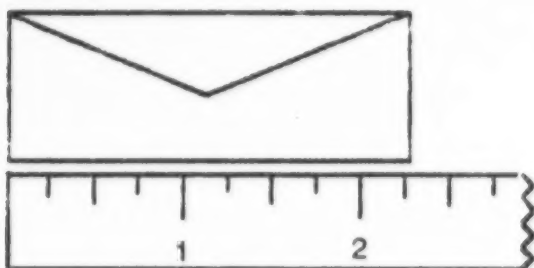
1.



- (a) 1 inch
- (b) 2 inches
- (c) 3 inches
- (d) 4 inches

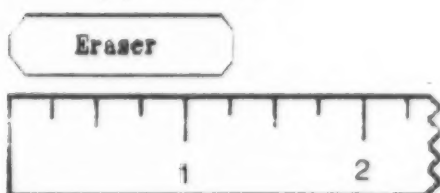
Test 1 (cont.)

2.



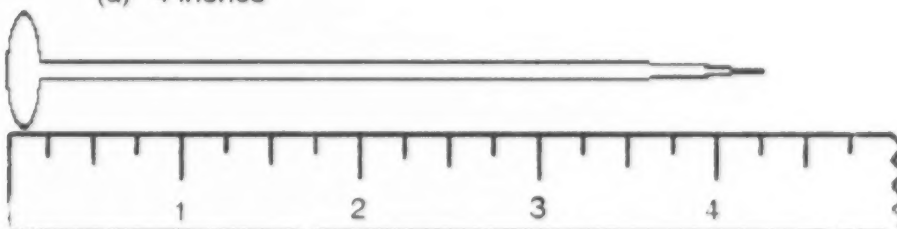
- (a) 1 inch
- (b) 2 inches
- (c) 3 inches
- (d) 4 inches

3.



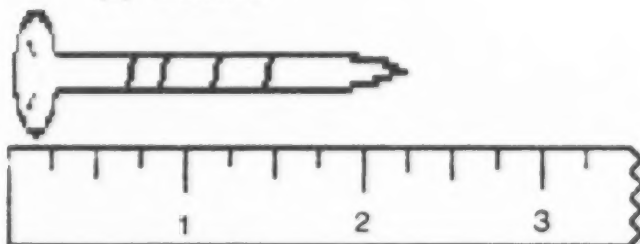
- (a) 1 inch
- (b) 2 inches
- (c) 3 inches
- (d) 4 inches

4.



- (a) 2 inches
- (b) 3 inches
- (c) 4 inches
- (d) 5 inches

5.

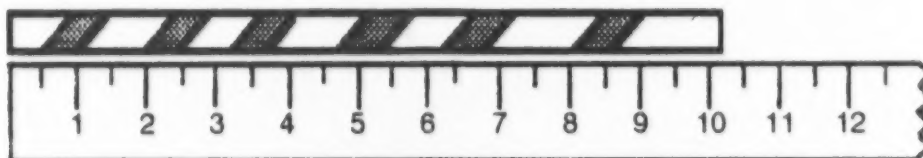


- (a) 1 inch
- (b) 2 inches
- (c) 3 inches
- (d) 4 inches

Sample Tests**Test 2**

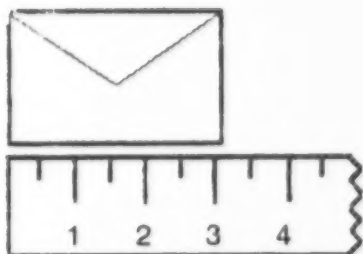
Part I Directions: Measure the length of each object to the nearest centimeter as shown by the metric ruler. Mark your answer on the answer sheet.

1.



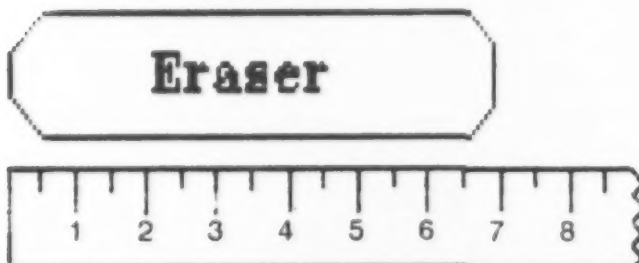
- (a) 13 centimeters
- (b) 12 centimeters
- (c) 11 centimeters
- (d) 10 centimeters

2.



- (a) 1 centimeter
- (b) 2 centimeters
- (c) 3 centimeters
- (d) 4 centimeters

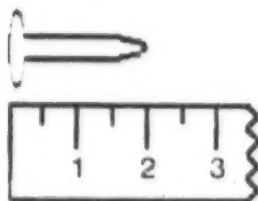
3.



- (a) 5 centimeters
- (b) 6 centimeters
- (c) 7 centimeters
- (d) 8 centimeters

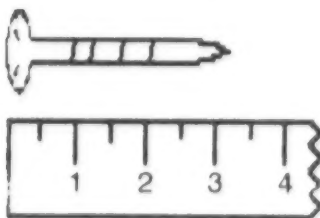
Test 2 (cont.)

4.



- (a) 1 centimeter
- (b) 2 centimeters
- (c) 3 centimeters
- (d) 4 centimeters

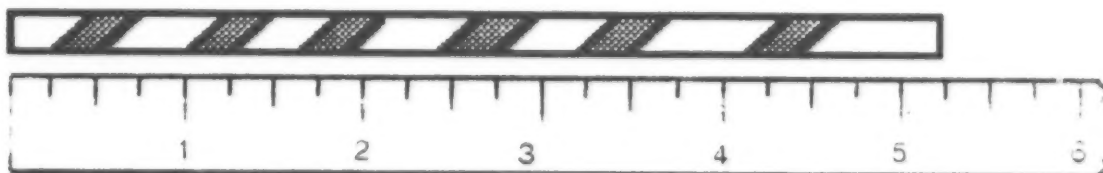
5.



- (a) 2 centimeters
- (b) 3 centimeters
- (c) 4 centimeters
- (d) 5 centimeters

Part II Directions: Measure the length of each object to the nearest inch as shown by the English ruler. Mark your answer on the answer sheet.

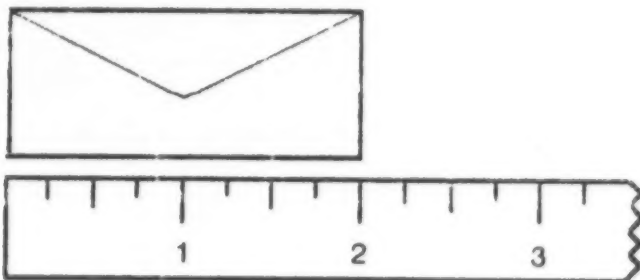
1.



- (a) 3 inches
- (b) 4 inches
- (c) 5 inches
- (d) 6 inches

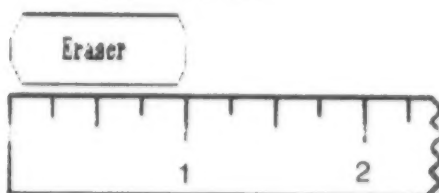
Test 2 (cont.)

2.



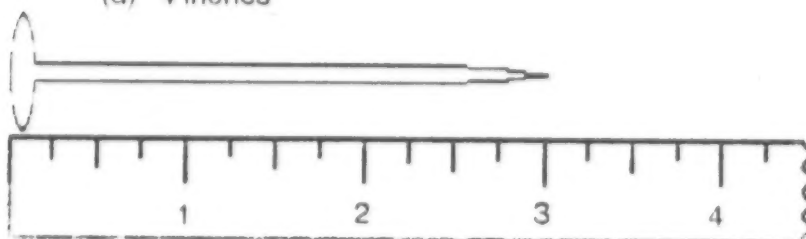
- (a) 1 inch
- (b) 2 inches
- (c) 3 inches
- (d) 4 inches

3.



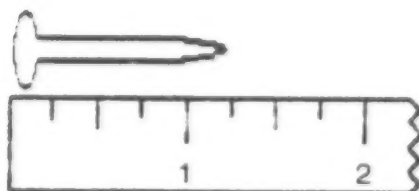
- (a) 1 inch
- (b) 2 inches
- (c) 3 inches
- (d) 4 inches

4.



- (a) 1 inch
- (b) 2 inches
- (c) 3 inches
- (d) 4 inches

5.



- (a) 4 inches
- (b) 3 inches
- (c) 2 inches
- (d) 1 inch

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.13

Select the appropriate unit of measure (English or metric) for problems involving length.

Explanation of Objective

Select the appropriate unit of English (i.e., inch, foot, yard) or metric (i.e., centimeter, meter) measure for problems involving length.

Prerequisite Skills (descending order)

- (a) Measure length to the nearest meter.
- (b) Measure length to the nearest centimeter.
- (c) Measure length to the nearest yard.
- (d) Measure length to the nearest foot.
- (e) Measure length to the nearest inch.

Vocabulary

height
length
width
meter
centimeter
yard
foot
inch
unit of measure
unit of English measure
unit of metric measure

Lesson Plan Outline

Introduction:

Have students use their feet, pencils, paper clips, and screws to measure several different items in the classroom (e.g. their desks, the chalkboard, a piece of paper, etc.). (Note: If the length is less than halfway between two numbers, use the smaller number. If the length is halfway or more between two numbers, use the larger number.) Have them record and compare their answers. Ask why their answers are different when they used different items with which to measure. Discuss the difficulties that may result from using

different-sized objects with which to measure. Point out that when the same objects were used to measure a particular item, answers were the same. Guide the students to see that a standard unit of measure would be much more useful. For example, say the following:

Pretend that two friends wanted to compare their heights. One friend measured himself to be 12 pencils tall. The other friend measured himself to be 60 paper clips tall. How would the two friends know who was taller? Shorter? They would not know because pencils and paper clips are hard to compare. They are not the same length. On the other hand, if one friend was 12 pencils tall and the other friend was 10 pencils tall, then who is taller? Shorter? These questions are easier to answer because the same unit of measure was used to measure both friends. One standard unit of metric measure that people use today is a centimeter. Use a centimeter ruler to illustrate the length of one centimeter on the chalkboard. Write the word "centimeter" on the board with its symbol, "cm". Give each student a centimeter ruler made from poster board and show the length of one centimeter, two centimeters, three centimeters, and so on. Demonstrate the correct measurement of an object by placing the edge of the ruler at the left edge of the object and measure. Draw horizontal and vertical line segments on the chalkboard. Have students take turns measuring the line segments and explaining how they arrived at their answers.

Activities:

Day 1:

1. Have pairs of students use their centimeter rulers and unifix cubes to practice measuring to the nearest centimeter. First, have them measure and record the length of 2 cubes, then 5 cubes, 10 cubes, and 20 cubes. As one pair of students finishes, they should find another pair of students that have also finished. These should compare their answers by having each one of the four illustrate how to measure one of the sets of cubes.
2. Have different pairs of students than in Activity #1 Day 1 use unifix cubes for additional practice in measuring to the nearest centimeter. Students should take turns with one student putting together a set of unifix cubes and the other student measuring the set.

Day 2:

1. Adapt the Introduction activity to introduce another metric unit of measure -- the meter. Show a meter stick to the students and say that it is one meter. Draw the length of one meter on the chalkboard and write "1 meter" beside it. Draw a line segment showing one centimeter under the line segment showing one meter and ask students how many centimeters do they think equals one meter. After several estimates have been made, write "1 meter = 100 centimeters" on the board. Additionally, illustrate the practicality of using a meter to measure the classroom door rather than a centimeter. Stress that the more practical a means of measurement, the more appropriate the means of measurement. Discuss the advantages of using meters for long measurements. Give each student a meter stick made from poster board and have pairs of them take turns measuring the length and width of the classroom. Discuss other things to

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measure where the use of a meter stick would be more practical than the use of a centimeter ruler.

2. Give pairs of students a list of ten items that they must pretend they have to measure. Each should take turns deciding the most appropriate unit of metric measure (i.e., centimeters or meters) to use, recording his/her answers, and telling why the answer was chosen.

Day 3:

1. Extend the Introduction activity to introduce the first unit of English measure -- the inch. Provide inch rulers made from poster board for each student.
2. Use unifix cubes as in Activity #1 Day 1 to practice measuring to the nearest inch. Students should also use their inch rulers.
3. Use unifix cubes as in Activity #2 Day 1 for additional practice in measuring to the nearest inch.

Day 4:

1. Adapt the Introduction activity to introduce another unit of English measure -- the foot. Provide a twelve inch ruler made from poster board for each student. Additionally, adapt Activity #1 Day 2 to illustrate the relationship between inches and feet.
2. Use a list of ten items in a similar manner as was used in Activity #2 Day 2. Students should decide whether inches or feet would be the most appropriate unit of English measure to use to measure the items.

Day 5:

1. Adapt the Introduction activity to introduce another unit of English measure -- the yard. Provide a yard stick made from cardboard for each student. Additionally, adapt Activity #1 Day 2 to illustrate the relationships among inches, feet, and yards.
2. Use a list of ten items in a similar manner as was used in Activity #2 Day 2. Students should decide whether inches, feet, or yards would be the most appropriate unit of English measure to use to measure the items.

Culmination:

Check students' understanding by naming an item to measure and having students show word cards with the most appropriate means of measurement (i.e., cards showing these words: inches, feet, yards, centimeters, and meter).

Materials

Introduction:

1. Pencils, paper clips, and screws for each student
2. A centimeter ruler made from poster board for each student

Day 1:

1. Unifix cubes for each student
2. A centimeter ruler made from poster board for each student

Day 2:

1. A meter stick made from poster board for each student
2. A list of ten items which students must decide whether centimeters or meters would be a more appropriate unit of metric measure to use to measure the items

Day 3:

1. Inch rulers made from poster board for each student
2. Unifix cubes for each student

Day 4:

1. Inch rulers made from poster board for each student
2. A list of ten items which students must decide whether inches or feet would be a more appropriate unit of English measure to use to measure the items

Day 5:

1. A yard stick made from poster board for each student
2. A list of ten items which students must decide whether inches, feet, or yards would be the most appropriate unit of English measure to use to measure the items

Sample Tests**Test 1**

Directions: Select the correct measuring unit needed to measure the quantity given in each item.

1. What unit of metric measure should be used to measure your foot?
 - (a) millimeter
 - (b) centimeter
 - (c) liter
 - (d) meter

2. What unit of English measure should be used to measure Bob's height?
 - (a) inch
 - (b) pound
 - (c) yard
 - (d) gallon

3. What unit of metric measure should be used to measure the height of a building?
 - (a) centimeter
 - (b) liter
 - (c) gram
 - (d) meter

4. What unit of English measure should be used to measure the length of a candle?
 - (a) inch
 - (b) pint
 - (c) yard
 - (d) gallon

5. What unit of metric measure should be used to measure the height of a soup can?
 - (a) meter
 - (b) milliliter
 - (c) centimeter
 - (d) kilogram

Test 1 (cont.)

6. What unit of English measure should be used to measure the length of a classroom at school?

- (a) quart
- (b) inch
- (c) yard
- (d) foot

7. What unit of metric measure should be used to measure the length of a paper clip?

- (a) centimeter
- (b) kilogram
- (c) meter
- (d) milliliter

8. What unit of English measure should be used to measure the length of an automobile?

- (a) ounce
- (b) yard
- (c) inch
- (d) pound

9. What unit of metric measure should be used to measure the length of a book?

- (a) meter
- (b) liter
- (c) gram
- (d) centimeter

10. What unit of English measure should be used to measure the length of your leg?

- (a) quart
- (b) foot
- (c) gallon
- (d) pint

Sample Tests**Test 2**

Directions: Select the correct measuring unit needed to measure the quantity given in each item.

1. What unit of English measure should be used to measure the length of your finger?

- (a) foot
- (b) yard
- (c) inch
- (d) pound

2. What unit of metric measure should be used to measure the length of a stapler?

- (a) centimeter
- (b) meter
- (c) liter
- (d) gram

3. What unit of English measure should be used to measure the height of a door?

- (a) ounce
- (b) inch
- (c) gallon
- (d) yard

4. What unit of metric measure should be used to measure the height of a tree?

- (a) meter
- (b) kilogram
- (c) milliliter
- (d) centimeter

5. What unit of English measure should be used to measure the length of your toe?

- (a) pint
- (b) inch
- (c) foot
- (d) yard

Test 2. (cont.)

6. What unit of metric measure should be used to measure the height of a milk carton?
- (a) meter
 - (b) gram
 - (c) centimeter
 - (d) milliliter
7. What unit of English measure should be used to measure the height of your teacher's desk?
- (a) yard
 - (b) pound
 - (c) quart
 - (d) foot
8. What unit of metric measure should be used to measure the length of a basketball court?
- (a) centimeter
 - (b) meter
 - (c) liter
 - (d) kilogram
9. What unit of English measure should be used to measure the length of your bedroom?
- (a) ounce
 - (b) gallon
 - (c) yard
 - (d) pint
10. What unit of metric measure should be used to measure the length of a flashlight?
- (a) centimeter
 - (b) liter
 - (c) gram
 - (d) milliliter

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.14

Make change up to one dollar.

Explanation of Objective

Solve simple word problems with no more than two simple sentences which require subtraction of money values up to \$1.00, regrouping as necessary.

Prerequisite Skills (descending order)

- (a) **Master Objective 3.15 (i.e., compare relationships among coins).**
- (b) Write horizontal two- and three-digit number sentences in vertical form to solve.
- (c) Subtract through 3-digit whole numbers, regrouping as necessary (Refer to TM 3.7 for skills prerequisite to this skill.).

Vocabulary

change
words used in word problems
solve
subtraction

Lesson Plan Outline

Introduction

Write the following word problem on the board:

Mary had 70¢ and spent 30¢. How much change will she get?

Ask students what must be done first before this problem can be solved. Write the word "Read" on the chalkboard and number it 1. Then, ask what must be done after the problem is read. Write the word "Identify" on the board and number it 2. Now, ask what must be done after the question and operation have been identified. Write the word "Write" on the board and number it 3. Say that after the question and the operation have been identified, then a number sentence must be written. Ask what must be done after a number sentence is written. Write the word "Solve" on the board and number it 4. Say that after the number sentence has been written, it must be solved. Once the answer is found, it must be checked to see if it is reasonable. Write the word "check" on the board and number it 5. Now, the board should look like the following:

1. Read
2. Identify
3. Write
4. Solve
5. Check

Repeat and explain each part of the step-by-step process. Refer to the problem written on the board. Apply the problem-solving process to it to find the solution. First, read the problem aloud. Next, ask students to identify the question asked and the important facts needed to solve the problem. Ask what operation does the question imply? Write "subtraction" on the board. Say that when you have a certain amount of money and you spend some of it, you will always subtract to find out how much change you have left. You will always be left with less money than you had in the beginning. Now ask someone to tell the subtraction number sentence needed to solve this problem. Write the following on the board:

$$70\text{c} - 30\text{c} = \quad \text{or} \quad \begin{array}{r} 70\text{c} \\ -30\text{c} \\ \hline \end{array}$$

Give a student 70c in play money, have him/her solve the problem and show the amount left. Discuss the various coins that could be used to make 40c. Stress that the cents sign ("c") be brought down and placed behind the "40" so that the answer will be complete. Show that 40c can also be written with a dollar sign (\$.40), but must never be written with both signs. Show other examples of both ways to write money values. Explain the necessity of labeling the answer. Additionally, stress the necessity of checking the answer. Rework the problem to check. Show students how to use addition (i.e., adding the difference and the subtrahend together to see if the answer is the minuend) to check. Also, emphasize that in order for an answer to be correct it must make sense and be reasonable. Write other similar problems on the board, apply the problem-solving process, and find the solution. Some of these problems should involve \$1.00 with emphasis on the dollar sign and the decimal. Additionally, some of the problems should involve regrouping. For detailed help in teaching and reviewing two-digit and three-digit subtraction with only one regrouping, refer to TM 3.7. The problems requiring subtraction with \$1.00 (e.g., \$1.00 - \$.34) will involve two regroupings. The activities described in TM 3.7 are very adaptable for the teaching of three-digit subtraction with two regroupings. Refer to those activities for additional information.

Activities:

Day 1:

1. Provide students with ten word problems written on 3 x 5 cards. The word problems should have no more than two simple sentences which require subtraction of money values up to \$1.00, regrouping as necessary. Have pairs of students work together to find the solutions. Both students should solve five problems each. They should use play money to help in finding the solution. Additionally, students should write the number sentences in vertical form, label and check the answers. When each has completed his/her five problems, he/she should explain to the other the step-by-step

process used to find the solutions.

2. When students have completed Activity #1 Day 1, have each set of partners make a list of their ten answers. For each answer, students should write at least four different ways the amount of money can be represented with coins and, in turn, draw the coins needed. For example, if an answer is 40c, a student may write 4 dimes = 40c and draw:



Students may use play money for assistance.

Day 2:

1. Have pairs of students play Tic Tac Toe using ten word problems written on 3 x 5 cards. The word problems should have no more than two simple sentences which require subtraction of money values up to \$1.00, regrouping as necessary. The correct solutions to the problems should be written on the backs of the cards so that students may check their answers. The first player should draw a card, solve the problem, check the answer, explain to the other player how the solution was found, and if the solution is correct, place an X or O card in a square on the Tic Tac Toe board (The X and O cards should be the same size as the squares on the Tic Tac Toe board.). If the solution is incorrect, the card should be returned to the draw pile. Then, the second player has a turn. The winner is the first player to get three X's or three O's in a row, column, or diagonal. Students may use play money for assistance.

2. Have students switch partners and play Tic Tac Toe as in Activity #1 Day 2. Use a different set of word problems.

Day 3:

1. Have students play store to practice making change to \$1.00. Have three storekeepers. The other students should be given a word problem card with no more than two simple sentences which require subtraction of money values to \$1.00, regrouping as necessary. The word problem cards should read similar to the following:

You have 50c. If you bought an item for 30c, how much change would you get?

Each student should get the amount of play money his/her card says that he/she has. Then, go to the store, purchase an item for the amount on the card, and give their money to one of the storekeepers. The storekeepers are to give each his/her appropriate change. Each student receiving change should use play money to see if the amount of change given is correct. Additionally, each student should check the amount of change by writing the corresponding number sentence and subtracting. If the amount of change is incorrect, he/she should go back to the storekeeper, and have him/her give the correct change.

2. After students have completed Activity #1 Day 3, repeat the activity using different students as storekeepers.

Culmination:

Check students' understanding by having each student solve five word problems which adhere to the limitations in the construction of word problems set forth in the Explanation of Objective.

Materials

All word problems created for this module should adhere to the limitations for construction of word problems set forth in the Explanation of Objective.

Introduction:

1. Several word problems to use as examples on the chalkboard
2. Play money

Day 1:

1. Ten word problems written on 3 x 5 cards for each pair of students
2. Play money for each pair of students
3. Blank paper for each student

Day 2:

1. One Tic Tac Toe board duplicated onto paper for each pair of students

Example:

Tic	Tac	Toe

2. Approximately six X cards and six O cards the same size as the squares on the Tic Tac Toe board for each pair of students
3. Twenty word problems written on 3 X 5 cards for each pair of students - ten for Activity #1 Day 2 and ten for Activity #2 Day 2
4. Play money for each pair of students

Day 3:

1. One word problem card for each student similar to the following:

You have \$1.00 and buy an item for 20¢. How much change will you get?

2. A make-believe store with items for purchase whose prices reflect the amounts of money students should spend as designated by their word problem cards
3. Play money for each student and for the storekeepers

Culmination:

1. Five word problems for each student

Examples of Word Problems to Use With Module

1. If you have 85¢ and spend 35¢, how much money will you have left?
2. Betty had 25¢ and spent 19¢ on gum. How much money did she have left?
3. John spent 91¢ for a paperback book. If he had \$1.00, how much money did he have left?
4. Sara had 67¢ and spent 55¢ for a candy bar. How much money did she have left?
5. If you spend 15¢ of your 84¢ allowance, how much money will you have left?
6. Jerry spent 22¢ of the 71¢ he had in his wallet. How much money did he have left?
7. Mike had 47¢ and spent 38¢. How much change did he have left?
8. Danny spent 16¢ for a balloon. If he had 46¢, how much money did he have left?
9. If you have \$1.00 and spend 59¢, how much money will you have left?
10. If you spend 63¢ of the 86¢ you have, how much money will you have left?

Sample Tests**Test 1**

Directions: Read the problem. Mark the letter of your answer on the answer sheet.

1. If you have 70¢ and spend 50¢, how much money is left?
 - (a) 20¢
 - (b) \$1.00
 - (c) 12¢
 - (d) 30¢
2. Bob had 30¢ and spent 15¢ on candy. How much change did he get?
 - (a) 45¢
 - (b) 10¢
 - (c) 25¢
 - (d) 15¢
3. A baseball player spent 25¢ for baseball cards. If he had \$1.00, how much change did he get?
 - (a) \$1.00
 - (b) 85¢
 - (c) 75¢
 - (d) 65¢
4. Susan had 63¢ and spent 50¢ for a soft drink. How much change did he have left?
 - (a) 23¢
 - (b) 68¢
 - (c) 13¢
 - (d) 58¢
5. If you spend 12¢ of your 29¢, how much is left?
 - (a) 7¢
 - (b) 17¢
 - (c) 31¢
 - (d) 41¢

Test 1 (cont.)

6. Joe had 83¢ and spent 47¢. How much was left?

- (a) 48¢
- (b) 36¢
- (c) 40¢
- (d) 30¢

7. Mark spent 18¢ for gum. If he started with 77¢, how much will he have left?

- (a) 59¢
- (b) 69¢
- (c) 61¢
- (d) 30¢

8. Jan spent 20¢ of the 27¢ she had in her purse. How much change will she have?

- (a) 17¢
- (b) 7¢
- (c) 47¢
- (d) 25¢

9. If you have \$1.00 and spend 65¢, how much change will you get?

- (a) 25¢
- (b) 45¢
- (c) 30¢
- (d) 35¢

10. If you spend 77¢ of the 80¢ you have, how much will be left?

- (a) 13¢
- (b) 17¢
- (c) 3¢
- (d) 23¢

Sample Tests**Test 2**

Directions: Read the problem. Mark the letter of your answer on the answer sheet.

1. If you have \$1.00 and spend 30¢, how much change will you get?
 - (a) 60¢
 - (b) 70¢
 - (c) 80¢
 - (d) \$1.00
2. Jane had 90¢ and spent 57¢. How much change will she get?
 - (a) 33¢
 - (b) 43¢
 - (c) 47¢
 - (d) 37¢
3. Bill spent 42¢ for a sucker. How much change will he get if he gives the storekeeper 65¢?
 - (a) 27¢
 - (b) 23¢
 - (c) 13¢
 - (d) 17¢
4. Kim had 33¢ and spent 25¢ on a video game. How much did she have left?
 - (a) 18¢
 - (b) 5¢
 - (c) 28¢
 - (d) 8¢
5. If you spend 40¢ of the 70¢ you have, how much change will you have left?
 - (a) 10¢
 - (b) 40¢
 - (c) 30¢
 - (d) 20¢

Test 2 (cont.)

6. If you have 81¢ and spend 13¢, how much change will you have left?

- (a) 68¢
- (b) 78¢
- (c) 72¢
- (d) 94¢

7. Sam spent 45¢ for a popsicle. If he had 50¢, how much change will he get?

- (a) 15¢
- (b) 95¢
- (c) 90¢
- (d) 5¢

8. Ben spent 8¢ of the 12¢ he had. How much change was left over?

- (a) 20¢
- (b) 10¢
- (c) 4¢
- (d) 20¢

9. You spend 11¢. How much change will you get if you give the storekeeper 19¢?

- (a) 18¢
- (b) 30¢
- (c) 8¢
- (d) 20¢

10. If you have 25¢ and spend 8¢, how much change will you get?

- (a) 7¢
- (b) 27¢
- (c) 23¢
- (d) 17¢

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.15

Compare relationships among coins up to one dollar: pennies, nickels, dimes, and quarters.

Explanation of Objective

Identify the value of a set of coins through one dollar (pennies, nickels, dimes, quarters) from a set of two to five coin drawings not exceeding a total of \$1.00.

Prerequisite Skills (descending order)

- (a) Identify the value of a set of pennies, nickels, and dimes not to exceed the value of \$.50.
- (b) Skip count by 2's, 5's, 10's, and 25's.
- (c) Identify a quarter from a set of coins or pictured sets of coins.
- (d) Identify a penny, nickel, and dime from a set of coins or pictured sets of coins.

Vocabulary

penny
nickel
dime
quarter
dollar
coin

Lesson Plan Outline

Introduction:

Show the students a penny, nickel, dime, and quarter. As the coins are shown, say the names of the coins and write them on the board. For example, when a penny is shown, the following should be written on the board:

penny

1¢

\$0.01

Emphasize the difference between the use of the cents sign and the dollar sign with the decimal point. Stress the correct placement of the decimal point. Show a penny and say that since it is worth one cent you would count by 1's to find the value of several pennies.

Demonstrate by showing five pennies and counting by 1's to find the total value of the coins. Show a nickel and say that since it is worth five cents, you would count by 5's to find the value of several nickels. Demonstrate by showing six nickels and counting by 5's to find the total value of the coins. Follow the same procedure used to show counting to determine the value of several dimes and then several quarters. Then, show several coins of one kind, ask students to find the value of the set of coins, and write the value on the board using both the cents sign and the dollar sign with the decimal point (note: The value of each set of coins should not exceed \$1.00.).

Activities:

Day 1:

1. Have one student come to the front of the room to be the caller. The caller should select a card that has a certain number of pennies, nickels, dimes, or quarters written on it (e.g., 6 nickels), tell the other students what is on the card, have them find that number of coins in play money, and count the coins. When all students have counted the coins, the caller should ask a student to tell the value of the set of coins (Note: The correct value of the coins should be written on the back of each card and should not exceed \$1.00.). The student that gives the correct money value gets to be the next caller. If no student can give the correct money value, the caller remains the same. Students should follow the procedure described above until all the cards have been used. (Optional: Students may work in pairs for this activity.)

2. Have students work in pairs with one student using play money to represent certain money values and the other student counting the play money and telling the money values. Money values should not exceed \$1.00 and in each arrangement of play money only one kind of coin should be used at a time (e.g., the student arranging the play money could place five dimes together to represent 50c as the first arrangement, but not three dimes and four nickels. The second arrangement could include nine pennies. The third arrangement could include three quarters, and so on.).

Day 2:

1. Demonstrate how money values can be represented in different ways through the use of different sets of coins. For example, 5c can be represented by one nickel or five pennies. Ask the students the various ways that a dime and a quarter can be represented. Then, ask students how they could determine a money value when different kinds of coins are placed together. For example, show them a quarter and a dime and write the following on the board:

$$25c + 10c = 35c$$

or

$$\$0.25 + \$0.10 = \$0.35$$

Tell students that a quicker way of finding the money value would be to count the money. Demonstrate counting to find the total money value with the quarter and the dime and various other sets of coins. Stress that counting should begin with the coin of greatest value and proceed in order to the coin of least value. Allow students to demonstrate counting money. Students having difficulty counting the money should be allowed to add money values to determine the total amount of money.

2. Provide cards to pairs of students where each card shows a combination of coins to count to determine the total money value. For example, a card may look as follows:

2 quarters
1 dime
1 nickel
3 pennies

One student is to draw a card, find the play money to represent the combination of coins on the cards, and give the coins to the other student to count (Answers should be on the backs of cards with no money values exceeding \$1.00). Students should take turns drawing cards and counting money until all cards have been used. Students having difficulty should be allowed to add the money values rather than count.

3. Adapt the previous activity, Activity #2 Day 2 by using different cards and seeing that students are paired with different partners.

Day 3:

1. Give pairs of students a list of ten different money values (e.g. one money value could be 35c or \$.35) and have students find as many different combinations of coins as possible to make each money value. For example, if 85c were the money value in question, then some of the combinations of coins that would make 85c are as follows: 6 quarters, 1 dime, 8 dimes, 1 nickel, and 17 nickels.

2. When Activity #1 Day 3 is completed, have students report their findings. Write their findings on the board. Have students tell the procedures they followed to arrive at their findings.

Quimination:

Check students' understanding by displaying cards showing various combinations of coins. Have students count each set of coins, write their answers on blank 6 x 5 cards, and display them.

Materials

Note: All combinations of coins used in this module should not exceed \$1.00.

Introduction:

1. Several pennies, nickels, dimes, and quarters - real money or play money

Day 1:

1. Cards showing certain numbers of pennies, nickels, dimes, or quarters - only one kind of coin should be written on each card

Example of 4 cards:

4 pennies

7 dimes

5 nickels

3 quarters

2. Play money for each student
3. Play money for each pair of students

Day 2:

1. Play money to use for demonstration
2. Cards for each pair of students showing various combinations of coins to be counted answers on the backs of cards

Example:

1 quarter
3 nickels
4 pennies

Day 3

1. A list of ten different money values for each pair of students

Culmination:

1. Cards showing various combinations of coins
2. Blank 3 x 5 cards for each student

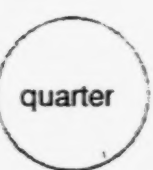
Sample Tests**Test 1**

Part I Directions: Look at each set of coins. Find the set that adds up to the amount in the question. Mark the letter of your answer on the answer sheet.

1. Which set shows 55¢?

- (a)    
- (b)  
- (c)     
- (d)  

2. Which set shows 31¢?

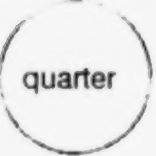
- (a)   
- (b)   
- (c)   
- (d)   

Test 1 (cont.)

3. Which set shows 47c?

- (a)   
- (b)     
- (c)     
- (d)    

4. Which set shows 90c?

- (a)     
- (b)    
- (c)     
- (d)     

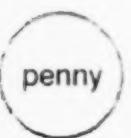
Test 1 (cont.)

5. Which set shows 26c?

- (a)    
- (b)  
- (c)   
- (d)  

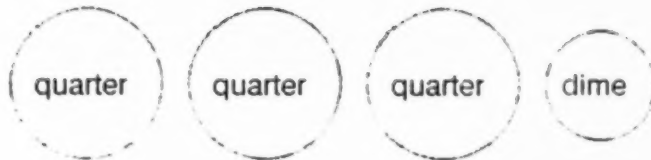
Part II Directions: Look at the set of coins. Tell how much money is pictured. Mark the letter of your answer on the answer sheet.

1.     
- (a) 25¢
 (b) 13¢
 (c) 12¢
 (d) 23¢

2.   
- (a) 36¢
 (b) 31¢
 (c) 27¢
 (d) 21¢

Test 1 (cont.)

3.



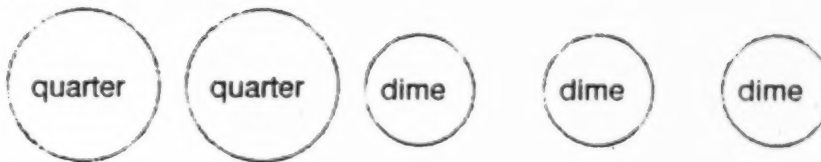
- (a) \$1.00
- (b) 80¢
- (c) 75¢
- (d) 85¢

4.



- (a) 12¢
- (b) 15¢
- (c) 16¢
- (d) 20¢

5.



- (a) 80¢
- (b) 85¢
- (c) 90¢
- (d) 95¢

Sample Tests**Test 2**

Part I Directions: Look at each set of coins. Find the set that adds up to the amount in the question. Mark the letter of your answer on the answer sheet.

1. Which set shows 80¢?

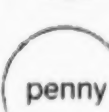
- (a) quarter quarter quarter penny
- (b) quarter quarter quarter nickel
- (c) quarter quarter dime dime
- (d) dime dime dime dime nickel

2. Which set shows 66¢?

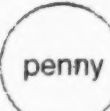
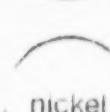
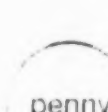
- (a) quarter quarter dime nickel penny
- (b) quarter quarter nickel nickel
- (c) quarter dime dime dime nickel
- (d) dime dime dime dime dime

Test 2 (cont.)

3. Which set shows 18c?

- (a)  
- (b)    
- (c)  
- (d)     

4. Which set shows 22c?

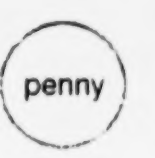
- (a)    
- (b)     
- (c)   
- (d)    

Test 2 (cont.)

5. Which set shows 71¢?

- (a)   
- (b)   
- (c)     
- (d)     

Part II Directions: Look at the set of coins. Tell how much money is pictured. Mark the letter of your answer on the answer sheet.

1.    

- (a) 40¢
(b) 41¢
(c) 37¢
(d) 35¢

2.     

- (a) 30¢
(b) 40¢
(c) 50¢
(d) 60¢

Test 2 (cont.)

3.

quarter

quarter

nickel

nickel

nickel

- (a) 65¢
- (b) 55¢
- (c) 45¢
- (d) 40¢

4.

dime

dime

nickel

nickel

penny

- (a) 21¢
- (b) 51¢
- (c) 41¢
- (d) 31¢

5.

dime

penny

penny

penny

penny

- (a) 14¢
- (b) 13¢
- (c) 12¢
- (d) 11¢

Teaching Module (TM)

Mathematics - Grade 3

Objective 3.16

Compare relationships among calendar units: days, weeks, months, years.

Explanation of Objective

Identify equivalent calendar units (days, weeks, months, year) by solving simple one- and two-sentence word problems which require converting days to weeks; weeks to days; weeks to years; years to weeks; months to years; and years to months. One of the units in each word problem must be singular (e.g., 1 week).

Prerequisite Skills (descending order)

- (a) Identify the day of a week for a given date from a calendar.
- (b) Name the days of the week.
- (c) Identify numerals 0 to 99.
- (d) Count 0 to 99 objects using correct number names.

Vocabulary

calendar	month
day	year
week	

Lesson Plan Outline

introduction:

Have students name the days of the week. Write the names of these days on the chalkboard and have the class count the number of days aloud. Then write $7 \text{ days} = 1 \text{ week}$ and $1 \text{ week} = 7 \text{ days}$, on the board. Give each student a paper showing a calendar with all the months of the year. Tell them that this calendar shows a whole year. Assist students in locating one week from the current month (e.g., if the current month is April in 1989, then students could locate the first full week, April 2-8). Once students have located this week, have them draw a ring around it on their calendars and count the number of days. Ask if the statement you had written on the board earlier is a true or false statement. Next, have students place their fingers on the month of January on their calendars. Have them move their fingers to each of the succeeding months while naming them aloud. Write the names of the months on the board. Have students count the number of months listed on the board and the number of months on the calendar. Ask the number of months in a year. Write on the board, $12 \text{ months} = 1 \text{ year}$ and $1 \text{ year} = 12 \text{ months}$. Point to the first two statements written on the board (i.e., $7 \text{ days} = 1 \text{ week}$ and $1 \text{ week} = 7 \text{ days}$).

Say to students that since these statements are true, they can look at their calendars and estimate the number of weeks in a year. Write students' estimates on the board. Then, assist students in drawing rings around all of the full 7 day weeks within each month on their calendars. When students have located all of the full 7 day weeks, have them count the number they found (e.g., the 1989 calendar shows 42 full weeks). Write the number on the board. Tell students that there are more than 42 weeks in a year. The days in each month that do not have a ring around them make up parts of weeks. Use a transparency made from the master used to construct the students' calendars to show how full weeks are split between months. Draw rings around each part week and connect it with arrows to its corresponding part week. Have students do likewise on their calendars and continue until they have made all of the full weeks that they can (Note: All days will be used to make full weeks except one. On a leap year, all days will be used except two.). Ask students why the day left over could not be included as an extra week. Then, have students count the total number of full weeks to discover 52 weeks. Write on the board, $52 \text{ weeks} = 1 \text{ year}$ and $1 \text{ year} = 52 \text{ weeks}$. Give several examples of word problems requiring identification of equivalent calendar units and have students look at the six statements written on the board for assistance in solving them. Problems should require conversions from days to weeks; weeks to days; weeks to years; years to weeks; months to years; and years to months with one of the units being singular. An example of a word problem of this nature is as follows:

Ken went on a trip for 1 week.
How many days was he gone?

Use the step-by-step problem-solving process described in TM 3.14 to help solve each of the problems. Adapt the second part of the second step, Identify, by replacing identifying the operation needed to solve the problem with identifying the statement to complete. For example, the statement to complete for the sample problem shown above is $1 \text{ week} = ? \text{ days}$. Have different students take turns explaining how to solve the example problems.

Activities:

Day 1:

1. Using the six statements written on the board during the Introduction activity and their calendars, if necessary, have pairs of students solve ten word problems. Each student should solve five problems and explain how he/she solved them to the other student. Problems should be written on 3 x 5 cards with the answers on the backs of the cards. They should require conversions from days to weeks; weeks to days; weeks to years; years to weeks; months to years; and years to months with one of the units being singular.

2. When all students have completed Activity #1 Day 1, have them take turns coming to the board and showing how they solved each problem.

Day 2:

1. Using the six statements written on the board in the Introduction activity as guidelines, have pairs of students construct their own word problems. Students may also use the word problems provided in Activity #1 Day 1 to guide their construction. Each student should construct three word problems and have his/her partner solve them (Note: Students may require guidance.)

2. After students have completed Activity #1 Day 2, have some of the pairs of students share their problems and solutions with the rest of the class.

Day 3:

1. If additional practice is needed, adapt Activity #1 Day 1 by using a different set of word problems. Proceed as described.

Culmination:

Check students' understanding by writing five or six word problems on the board. Point to the problems one by one and have students display the numeral card which shows the appropriate answer. Each student should have cards showing these numerals - 1, 7, 12, 52. Problems should require conversions from days to weeks; weeks to days; weeks to years; years to weeks; months to years; and years to months where one unit is singular.

Materials

Introduction:

1. A calendar showing all the months and days of the year reproduced on paper for each student

S M T W T F S	S M T W T F S
JAN	FEB
1 2 3 4 5 6 7	1
8 9 10 11 12 13 14	2 3 4 5 6 7 8
15 16 17 18 19 20 21	9 10 11 12 13 14 15
22 23 24 25 26 27 28	16 17 18 19 20 21 22
29 30 31	23 24 25 26 27 28 29
	30
FEB	MAY
1 2 3 4	1 2 3 4 5 6
5 6 7 8 9 10 11	7 8 9 10 11 12 13
12 13 14 15 16 17 18	14 15 16 17 18 19 20
19 20 21 22 23 24 25	21 22 23 24 25 26 27
26 27 28	28 29 30 31
MAR	JUNE
1 2 3 4	1 2 3
5 6 7 8 9 10 11	4 5 6 7 8 9 10
12 13 14 15 16 17 18	11 12 13 14 15 16 17
19 20 21 22 23 24 25	18 19 20 21 22 23 24
26 27 28 29 30 31	25 26 27 28 29 30

S M T W T F S	S M T W T F S
JULY	OCT
1	1 2 3 4 5 6 7
2 3 4 5 6 7 8	8 9 10 11 12 13 14
9 10 11 12 13 14 15	15 16 17 18 19 20 21
16 17 18 19 20 21 22	22 23 24 25 26 27 28
23 24 25 26 27 28 29	29 30 31
30 31	
AUG	NOV
1 2 3 4 5	1 2 3 4
6 7 8 9 10 11 12	5 6 7 8 9 10 11
13 14 15 16 17 18 19	12 13 14 15 16 17 18
20 21 22 23 24 25 26	19 20 21 22 23 24 25
27 28 29 30 31	26 27 28 29 30
SEPT	DEC
1 2	1 2
3 4 5 6 7 8 9	3 4 5 6 7 8 9
10 11 12 13 14 15 16	10 11 12 13 14 15 16
17 18 19 20 21 22 23	17 18 19 20 21 22 23
24 25 26 27 28 29 30	24 25 26 27 28 29 30
	31

2. A transparency showing all of the months and days of the year made from the master used to make the students' calendars (Refer to Materials #1 Introduction)

3. Six or seven examples of word problems requiring conversions from days to weeks, weeks to days, weeks to years, years to weeks, months to years, and years to months where one unit is singular.

Day 1:

1. The following six statements written either on the board or reproduced on paper:

1 week = 7 days

7 days = 1 week

1 year = 52 weeks

52 weeks = 1 year

1 year = 12 months

12 months = 1 year

2. Student calendars used in the introduction, if necessary.

3. Ten word problems on 3 x 5 cards with answers on the backs of cards (Note: Problems should require conversions from days to weeks, weeks to days, weeks to years, years to weeks, months to years, and years to months where one unit is singular.).

Day 2:

1. The six statements listed in Materials #1 Day 1

2. The word problems used in Activity #1 Day 1 and described in Materials #3 Day 1

Day 3:

1. For additional practice, a set of word problems following the same guidelines but different from those used in Activity #1 Day 1

Culmination:

1. Five or six word problems requiring conversions from days to weeks, weeks to days, weeks to years, years to weeks, months to years, and years to months where one unit is singular.

2. Numeral cards for each student with the following numerals: 1, 7, 12, 52

Sample Tests**Test 1**

Directions: Read the problem. Solve the problem. Mark the letter of the answer on your answer sheet.

1. Bob went to camp for 1 week. How many days was he gone?

- (a) 4
- (b) 5
- (c) 7
- (d) 12

2. Mary lived in the city for 1 year. How many months did she live there?

- (a) 12
- (b) 7
- (c) 9
- (d) 10

3. Sue's trip lasted 7 days. How many weeks was she gone?

- (a) 52
- (b) 1
- (c) 12
- (d) 2

4. Ben has gone to school for 52 weeks. How many years was he there?

- (a) 1
- (b) 2
- (c) 12
- (d) 5

5. Joe's dog is 12 months old. How many years old is the dog?

- (a) 2
- (b) 3
- (c) 7
- (d) 1

Test 1 (cont.)

6. Ann has lived in her house for 1 year. How many weeks has she been there?

- (a) 7
- (b) 12
- (c) 52
- (d) 20

7. If you have a birthday in 1 week, how many days until your birthday?

- (a) 10
- (b) 7
- (c) 12
- (d) 5

8. The circus will be here in 12 months. How many years until the circus comes?

- (a) 2
- (b) 7
- (c) 1
- (d) 12

9. Aunt Betty will visit in 1 year. How many weeks until she comes?

- (a) 52
- (b) 12
- (c) 7
- (d) 1

10. Bill goes to see Uncle Bob for 7 days. How many weeks is he gone?

- (a) 2
- (b) 7
- (c) 12
- (d) 1

Sample Tests**Test 2**

Directions: Read the problem. Solve the problem. Mark the letter of the answer on your answer sheet.

1. Ross was in the hospital for 7 days. How many weeks was he there?

- (a) 2
- (b) 3
- (c) 12
- (d) 1

2. Pat lived in the country for 52 weeks. How many years was she there?

- (a) 1
- (b) 7
- (c) 12
- (d) 2

3. If you go to camp for 1 week, how many days will you be gone?

- (a) 7
- (b) 12
- (c) 5
- (d) 8

4. Lou's cat is 1 year old. How many months old is the cat?

- (a) 7
- (b) 12
- (c) 52
- (d) 2

5. Jane's bird is 1 year old. How many weeks old is the bird?

- (a) 12
- (b) 7
- (c) 52
- (d) 6

Test 2 (cont.)

6. Sam bought his car 12 months ago. How many years ago did Sam buy his car?

- (a) 7
- (b) 1
- (c) 52
- (d) 2

7. If you stayed with a friend for 7 days, how many weeks were you there?

- (a) 1
- (b) 2
- (c) 12
- (d) 52

8. Wes will be moving in 52 weeks. In how many years will Wes be moving?

- (a) 2
- (b) 7
- (c) 12
- (d) 1

9. The trip lasted 1 week. How many days did the trip last?

- (a) 12
- (b) 7
- (c) 52
- (d) 10

10. Ann will have a party in 1 year. How many months until her party?

- (a) 12
- (b) 52
- (c) 7
- (d) 2

Teaching Module (TM)

Mathematics Grade 3

Objective 3.17

Solve word problems involving whole numbers, using one of the basic operations.

Explanation of Objective

Solve one-step word problems involving whole numbers using one of the basic operations with or without regrouping. If regrouping problems are used, no more than one regrouping per problem should be required. Each problem should have no more than three simple sentences. Addition problems may involve up to three two-digit addends having a sum less than 200. Subtraction problems may involve up to a three-digit minuend and a two-digit subtrahend. Multiplication problems may involve basic facts through 5×9 . Division problems may involve basic facts through $45 \div 9$.

Prerequisite Skills (descending order)

- (a) Divide two numbers using basic facts through $45 \div 9$.
- (b) Multiply two numbers using basic facts through 5×9 .
- (c) Write horizontal two- and three-digit addition and subtraction number sentences in vertical form to solve.
- (d) Subtract up to a two-digit minuend from a three-digit subtrahend with and without regrouping.
- (e) Add up to three two-digit addends having a sum less than 200 with and without regrouping.
- (f) Solve simple verbal word problems with the use of manipulatives.

Vocabulary

add	multiplication
plus	divide
addition	divided by
subtract	division
minus	operation
subtraction	solve
multiply	times

Lesson Plan Outline

Introduction:

Write the following word problem on the board:

There were 6 girls in the park.
 There were 3 boys in the park.
 How many children in all?

Review the step-by-step problem-solving process used in TM 3.14. Write the five steps of the process on the chalkboard in the following manner:

1. Read
2. Identify
3. Write
4. Solve
5. Check

Briefly explain the process as follows:

1. Read -- Read carefully.
2. Identify -- What are the important facts?
 What is the question?
 What operation is needed?
3. Write -- Write the number sentence.
4. Solve -- Solve the problem by completing the number sentence.
 Label the answer.
5. Check -- Rework the problem.
 Did you answer the question?
 Does the answer make sense? Is it reasonable?

Tell the students that all five steps are extremely important and that they will learn how to perform each step. For now, however, emphasis will be placed on the first two steps. Demonstrate the use of the first two steps by applying them to the problem written on the board as shown below:

1. Read -- Read the problem aloud slowly and carefully
2. Identify -- What are the important facts?
 6 girls
 3 boys
 What is the question?
 How many children in all?
 What operation is needed?
 Addition

Encourage students to look for key words such as "how many in all," "how many altogether," "how many more," "how many less," "how many are left," and "difference" to help them in selecting the appropriate operation. Also, demonstrate and encourage drawing pictures and/or using counters to help students in their understandings. Provide at least four other examples of the application of the first two steps. At this time, use only addition and subtraction problems. Do not write the number sentence or solve the problem. These two steps will be emphasized later.

Activities:

Day 1:

1. Have pairs of students work together to identify the operation needed to solve ten addition and subtraction word problems. Problems are to be written on 3 x 5 cards with answers on the backs of the cards (Refer to Explanation of Objective for limitations in the construction of word problems.). Each student is to draw a card from the container and identify the operation needed to solve it. If his/her response is correct, he/she should explain the procedure he/she used in determining the response to the other student and keep the card until the end of the game. Students should continue in this manner until all of the cards have been drawn. The student with the most cards at the end of the day is the winner.
2. Write the ten word problems from Activity #1 Day 1 on the chalkboard. Check students' progress by having some of them come to the board and explain how they identified the appropriate operations.

Day 2:

1. Write the word problem used in the Introduction on the chalkboard. Review the application of the first two steps. After reviewing these steps, the board should look as follows:

There were 6 girls in the park.
 There were 3 boys in the park.
 How many children in all?

1. Read -- Read carefully.
2. Identify -- What are the important facts?
 6 girls
 3 boys
 What is the question?
 How many children in all?
 What operation is needed?
 Addition

Say that now that students have learned to perform the first two steps of the problem-solving process, the last three steps must be learned. Write the following under the steps already written on the board:

3. Write -- Write the number sentence.
4. Solve -- Solve the problem by completing the number sentence.
 Label the answer.
5. Check -- Rework the problem.
 Did you answer the question?
 Does the answer make sense? Is it reasonable?

Ask students to consider the important facts identified in step #2 and decide which number sentence should be written. If students have difficulty in deciding where to begin, ask them to choose between the following two number sentences:

$$6 + 3 \text{ or } 6 - 3$$

Then, step #3 on the board should look as follows:

3. Write -- Write the number sentence.

$$6 + 3 = \quad \text{or} \quad \begin{array}{r} 6 \\ +3 \\ \hline \end{array}$$

Next, ask students to solve the problem by completing the number sentence and labeling the answer. Students may say that 9 is the answer. Say that 9 is the answer to $6 + 3$, but that to be the answer to the problem it must be labeled as 9 children. Now, step #4 on the board should look as follows:

4. Solve -- Solve the problem by completing the number sentence.

$$6 + 3 = 9 \quad \text{or} \quad \begin{array}{r} 6 \\ +3 \\ \hline 9 \end{array}$$

Label the answer.
9 children

Tell students that the problem-solving process is not complete until they perform step #5 -- checking the answer. In order to check, students should rework the problem, see if the answer makes sense and is reasonable. Step #5 on the board should look as follows:

5. Check -- Rework the problem.
Did you answer the question?
Yes, 9 children
Does the answer make sense?
Yes
Is the answer reasonable?
Yes

Provide other examples of applying the five-step process to solve word problems. At this time, use only addition and subtraction word problems.

2. Have pairs of students work together to solve eight addition and subtraction word problems written on 3 x 5 cards (Refer to Explanation of Objective for limitations in the construction of word problems. Additionally, if students had difficulty in deciding where to begin in writing the number sentences in the problems for Activity #1 Day 2,

give them extra help. Provide two number sentences from which to choose the correct number sentence. Then, have them find the answer to the number sentence they chose.

Day 3:

1. Adapt the introduction activity to introduce multiplication and division word problems (Refer to Explanation of Objective for limitations in the construction of word problems.). Briefly, review the five-step problem-solving process, but deal only with the first two steps at this time. Additionally, use only multiplication and division word problems at this time. Demonstrate and encourage drawing pictures and/or using counters to help students in understanding the problem.
2. Extend Activity #1 Day 1 to include ten multiplication and division word problems in the place of the addition and subtraction problems. Play the card game in the same manner.
3. Adapt Activity #2 Day 1 to include the ten multiplication and division word problems from Activity #2 Day 2 rather than the addition and subtraction problems.

Day 4:

1. Adapt Activity #1 Day 2 to introduce the application of the last three steps of the problem-solving process to multiplication and division word problems. Again, supply students with two number sentences from which to choose the correct sentence if they have difficulty.
2. Adjust Activity #2 Day 2 to include eight multiplication and division word problems rather than addition and subtraction problems.

Day 5:

1. Extend Activity #1 Day 1 to include 20 word problems. Five should be addition, five subtraction, five multiplication, and five division.
2. Adapt Activity #2 Day 1 to include all or some of the 20 word problems used in Activity #1 Day 5.
3. Extend Activity #2 Day 2 to include 16 word problems with four being addition, four subtraction, four multiplication, and four division. Each student within each pair of students should solve eight problems.

Culmination:

Check students' understanding by having each student solve five word problems which adhere to the limitations in the construction of objectives set forth in Explanation of Objective.

Materials

(Note: All word problems created for this module should adhere to the limitations in the construction of word problems set forth in the Explanation of Objective.)

Introduction:

1. Counters (optional)
2. Five addition and subtraction word problems to use as examples

Day 1:

1. Ten addition and subtraction word problems written on 3 x 5 cards for each pair of students
2. The ten addition and subtraction word problems described in Materials #1 Day 1

Day 2:

1. Addition and subtraction word problems to use as examples
2. Eight addition and subtraction word problems written on 3 x 5 cards for each pair of students

Day 3:

1. Counters (optional)
2. Five multiplication and division word problems to use as examples
3. Ten multiplication and division word problems written on 3 x 5 cards for each pair of students
4. The ten multiplication and division word problems described in Materials #3 Day 3

Day 4:

1. Multiplication and division word problems to use as examples
2. Eight multiplication and division word problems written on 3 x 5 cards for each pair of students

Day 5:

1. Twenty word problems with five being addition, five subtraction, five multiplication, and five division for each pair of students

2. The twenty word problems described in Materials #1 Day 5
3. Sixteen word problems with four being addition, four subtraction, four multiplication, and four division for each pair of students

Culmination:

1. Five word problems for each student

Examples of Word Problems to Use With Module

1. Robbie sold 53 newspapers on Friday and 22 newspapers on Saturday. How many newspapers did she sell altogether?
2. There are 7 boxes of golf balls. There are 4 golf balls in each box. How many golf balls are there in all?
3. There are 5 cars. There are 4 people in each car. How many people are there in the 5 cars?
4. Butch had 51 marbles. He gave 20 marbles to Jim. How many marbles did he have left?
5. There were 213 people at the ballgame. 157 people left. How many people were still at the ballgame?
6. Jan had 3 bags of candy. There were 8 pieces of candy in each bag. How many pieces of candy did Jan have altogether?
7. Jean had 20 bows. She put 4 in each box. How many boxes did she use?
8. Joe had 45 pieces of gum. Bill gave him 35 more pieces of gum. How many pieces of gum did he have then?
9. There were 9 people in each school club. There were 45 people. How many clubs were there?
10. Sue had 116 circus tickets. She sold 66 tickets. How many tickets did she have left to sell?

Sample Tests**Test 1**

Directions: Solve the following problems. You may use scratch paper. Mark the letter of your answer on your answer sheet.

1. Sue has 5 cookies. She gave Bob 3. How many cookies does Sue have left?

- (a) 8
- (b) 2
- (c) 15
- (d) 1

2. Mary had 14 friends at her party. Later, 3 more friends came. How many friends were there altogether?

- (a) 17
- (b) 11
- (c) 44
- (d) 18

3. There were 4 bags of candy. 9 pieces were in each bag. How many pieces of candy were there in all?

- (a) 13
- (b) 5
- (c) 32
- (d) 36

4. One boat holds 3 people. There are 21 people. How many boats are needed?

- (a) 63
- (b) 24
- (c) 18
- (d) 7

5. There are 5 players on each team. There are 25 players. How many teams are there?

- (a) 20
- (b) 30
- (c) 5
- (d) 10

Test 1 (cont.)

6. Bob has 10 whistles. Mary has 4 and Bob has 17. How many whistles do they have altogether?

- (a) 31
- (b) 21
- (c) 30
- (d) 41

7. There were 293 people at the game. 37 people went home. How many people were still at the game?

- (a) 330
- (b) 256
- (c) 266
- (d) 264

8. There were 35 boys at camp. 5 boys stayed in each cabin. How many cabins did they use?

- (a) 30
- (b) 40
- (c) 7
- (d) 6

9. There are 4 flowers in each row. There are 4 rows. How many flowers in all?

- (a) 16
- (b) 1
- (c) 0
- (d) 8

10. John had 61 paper clips. Bill gave him 9 more. How many does he have now?

- (a) 68
- (b) 60
- (c) 52
- (d) 70

Sample Tests**Test 2**

Directions: Solve the following problems. You may use scratch paper. Mark the letter of your answer on your answer sheet.

1. Betty sold 25 bars of candy Monday. She sold 50 bars Tuesday. How many bars of candy did she sell altogether?

- (a) 75
- (b) 25
- (c) 70
- (d) 30

2. Kim had 47 buttons. She gave 19 buttons to Tom. How many buttons did she have left?

- (a) 27
- (b) 66
- (c) 28
- (d) 32

3. There are 4 roses in a row. There are 7 rows. How many roses are there in all?

- (a) 11
- (b) 28
- (c) 3
- (d) 24

4. Dan has 29 bottles. Jim has 8 bottles and Pat has 60. How many bottles do they have altogether?

- (a) 41
- (b) 97
- (c) 81
- (d) 87

5. There are 3 boxes of balloons. There are 6 balloons in each box. How many balloons are there in all?

- (a) 9
- (b) 3
- (c) 2
- (d) 18

Test 2 (cont.)

6. Sally had 18 bugs. She put 6 in each box. How many boxes did she use?

- (a) 24
- (b) 14
- (c) 3
- (d) 2

7. There were 6 rows of cars in the lot. There were 5 cars in each row. How many cars were there in all?

- (a) 30
- (b) 11
- (c) 10
- (d) 25

8. Joe had 43 toy cars. He gave Bill 16 cars. How many cars did he have left?

- (a) 33
- (b) 37
- (c) 59
- (d) 27

9. There were 335 people in the store. 62 people left. How many people were still in the store?

- (a) 273
- (b) 333
- (c) 373
- (d) 277

10. Jan had 2 packs of gum. There were 5 pieces of gum in each pack. How many pieces of gum were there in all?

- (a) 7
- (b) 10
- (c) 3
- (d) 2